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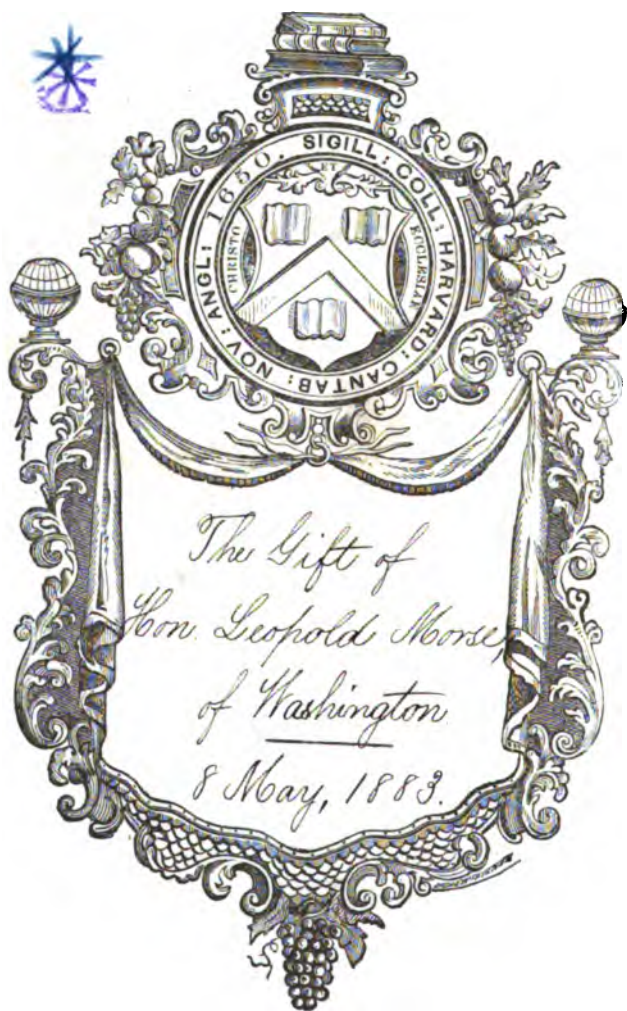
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THE  
AMERICAN EPHEMERIS

AND  
NAUTICAL ALMANAC

FOR THE YEAR  
1885

*FIRST EDITION*

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*PUBLISHED IN COMPLIANCE WITH A JOINT RESOLUTION OF THE FORTY-SIXTH CONGRESS*

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WASHINGTON  
BUREAU OF NAVIGATION  
1882

130.5

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MAY 8 1883

JOINT RESOLUTION

FOR PRINTING THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be printed annually at the Government Printing Office fifteen hundred copies of the American Ephemeris and Nautical Almanac and of the papers supplementary thereto, of which one hundred shall be for the use of the Senate, four hundred for the House of Representatives, and one thousand for the public service, to be distributed by the Navy Department.*

*Sec. 2. That additional copies of the Ephemeris and of the Nautical Almanac extracted therefrom may be ordered by the Secretary of the Navy for sale: Provided, That all moneys received from such sale shall be deposited in the Treasury to the credit of the appropriation for public printing.*

*Approved, February 11, 1880.*



## PREFACE.

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THE contents of the present volume of *The American Ephemeris* are, in general, similar to those of the volume for the preceding year. Beginning with the volume for the year 1882, the arrangement of the work is as follows:—

Part I, *Ephemeris for the Meridian of Greenwich*, gives the positions of the major planets, and other fundamental astronomical data for equidistant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington*, gives the ephemerides of the fixed stars, sun, moon, and major planets for transit over the meridian of Washington. The mean places of the fixed stars and data for their reduction are also included in this Part. The list of mean and apparent places of fixed stars has been greatly enlarged, for the convenience of field-astronomers.

Part III, *Phenomena*, contains predictions of phenomena to be observed, with data for their computation. Washington mean time is used in this Part except in a few cases, notably that of eclipses, where Greenwich mean time was judged more convenient. The additions comprise more complete data for eclipses of the sun, diagrams showing the configurations of the satellites of Jupiter, data respecting the disks of Mercury and Venus for the reduction of meridian and photometric observations, and diagrams, with tables, for identifying any known satellites of other planets.

SIMON NEWCOMB,

*Professor U. S. Navy, Superintendent.*

WASHINGTON, June 30, 1882.



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# CORRECTIONS.

## EPHEMERIS FOR 1883 (FIRST AND SECOND EDITIONS).

(Continued from page vi of the first edition of the Ephemeris for 1884.)

Page 293, $\sigma$ Andromedæ, $0^h 12^m$ , declination,	for $+ 35^\circ$	read $+ 36^\circ$
295, $\zeta$ Geminorum, $6^h 57^m$ , right ascension,	for $10^{\circ}.454$	read $10^{\circ}.184$
Annual variation in R. A.,	for $+ 3.6527$	read $+ 3.5627$
297, $\xi$ Hydræ, $11^h 27^m$ , declination,	for $17''.76$	read $37''.76$

## EPHEMERIS FOR 1884 (FIRST EDITION).

Page 293, $\sigma$ Andromedæ, $0^h 12^m$ , declination,	for $+ 35^\circ$	read $+ 36^\circ$
295, $\zeta$ Geminorum, $6^h 57^m$ , right ascension,	for $14^{\circ}.108$	read $13^{\circ}.747$
Annual variation in R. A.,	for $+ 3.6527$	read $+ 3.5627$
297, $\xi$ Hydræ, $11^h 27^m$ , declination,	for $37''.64$	read $57''.64$
315, $\alpha$ Cassiopeæ, Dec. 34.2, declination,	for $88''.9$	read $98''.9$
339, $\eta$ Bootis, Dec. 34.8, right ascension,	for $11^{\circ}.24$	read $12^{\circ}.24$

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

THE YEAR 1885, WHICH COMPRISES THE LATTER PART OF THE 109TH AND THE BEGINNING OF THE 110TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

- The year 6598 of the Julian Period ;  
“ 7393-94 of the Byzantine era, the year 7394 commencing on September 1st;  
“ 5645-46 of the Jewish era, the year 5646 commencing on September 10th, 1885, or, more exactly, at sunset on September 9th;  
“ 2638 since the foundation of Rome, according to VARRO;  
“ 2632 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period: corresponding, in the notation of chronologists, to the 747th; and, in the notation of astronomers, to the 746th year before the birth of CHRIST;  
“ 2661 of the Olympiads, or the first year of the 666th Olympiad commencing in July, 1885, if we fix the era of the Olympiads at 775½ years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period;  
“ 2197 of the Grecian era, or the era of the Seleucidæ;  
“ 1601 of the era of DIOCLETIAN.

The year 1303 of the Mohammedan era, or the era of the Hegira, begins on the 10th day of October, 1885.

The first day of January of the year 1885 is the 2,409,543d day since the commencement of the Julian Period.

CHRONOLOGICAL CYCLES.

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## SYMBOLS AND ABBREVIATIONS.

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### SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♁	The Earth.	♆	Neptune.

### SIGNS OF THE ZODIAC.

Spring Signs.	{	1. ♈	Aries.	Autumn Signs.	{	7. ♎	Libra.
		2. ♉	Taurus.			8. ♏	Scorpius.
		3. ♊	Gemini.			9. ♐	Sagittarius.
Summer Signs.	{	4. ♋	Cancer.	Winter Signs.	{	10. ♑	Capricornus.
		5. ♌	Leo.			11. ♒	Aquarius.
		6. ♍	Virgo.			12. ♓	Pisces.

### ASPECTS.

- ♌ Conjunction, or having the same Longitude or Right Ascension.
- ☐ Quadrature, or differing 90° in Longitude or Right Ascension.
- ♌ Opposition, or differing 180° in Longitude or Right Ascension.

### ABBREVIATIONS.

♈	Ascending Node.	°	Degrees.
♏	Descending Node.	'	Minutes of Arc.
N.	North.	"	Seconds of Arc.
S.	South.	h	Hours.
E.	East.	m	Minutes of Time.
W.	West.	s	Seconds of Time.



**ASTRONOMICAL EPHEMERIS**

**FOR THE**

**MERIDIAN OF GREENWICH**

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Thur.	1	<sup>h</sup> 18 <sup>m</sup> 49 <sup>s</sup> 13.25	11.032	S. 22° 58' 9".	+12.97	16' 18.41"	71.06	<sup>m</sup> 4 <sup>s</sup> 0.29	1.171
Frid.	2	18 53 37.82	11.017	22 52 44.8	14.11	16 18.41	71.01	4 28.23	1.156
Sat.	3	18 58 2.03	11.001	22 46 52.5	15.24	16 18.40	70.96	4 55.80	1.141
SUN.	4	19 2 25.85	10.984	22 40 33.0	+16.37	16 18.38	70.90	5 22.98	1.124
Mon.	5	19 6 49.25	10.966	22 33 46.6	17.49	16 18.35	70.84	5 49.74	1.106
Tues.	6	19 11 12.20	10.947	22 26 33.4	18.60	16 18.32	70.78	6 16.07	1.087
Wed.	7	19 15 34.69	10.927	22 18 53.6	+19.70	16 18.29	70.72	6 41.93	1.067
Thur.	8	19 19 56.69	10.906	22 10 47.3	20.80	16 18.25	70.65	7 7.30	1.046
Frid.	9	19 24 18.17	10.884	22 2 15.0	21.89	16 18.20	70.58	7 32.15	1.024
Sat.	10	19 28 39.11	10.861	21 53 16.8	+22.96	16 18.15	70.50	7 56.47	1.001
SUN.	11	19 32 59.48	10.837	21 43 58.0	24.02	16 18.10	70.42	8 20.22	0.977
Mon.	12	19 37 19.25	10.812	21 34 3.9	25.07	16 18.04	70.33	8 43.39	0.952
Tues.	13	19 41 38.40	10.786	21 23 49.8	+26.11	16 17.98	70.24	9 5.92	0.926
Wed.	14	19 45 56.92	10.759	21 13 10.9	27.13	16 17.91	70.15	9 27.82	0.899
Thur.	15	19 50 14.78	10.731	21 2 7.6	28.14	16 17.84	70.06	9 49.06	0.871
Frid.	16	19 54 31.96	10.701	20 50 40.2	+29.14	16 17.76	69.96	10 9.64	0.842
Sat.	17	19 58 48.44	10.671	20 38 49.0	30.12	16 17.68	69.86	10 29.50	0.812
SUN.	18	20 3 4.18	10.640	20 26 34.4	31.09	16 17.60	69.76	10 48.63	0.781
Mon.	19	20 7 19.17	10.608	20 13 56.7	+32.04	16 17.51	69.66	11 7.02	0.749
Tues.	20	20 11 33.40	10.576	20 0 56.2	32.98	16 17.42	69.55	11 24.65	0.717
Wed.	21	20 15 46.85	10.544	19 47 33.3	33.90	16 17.33	69.45	11 41.50	0.685
Thur.	22	20 19 59.50	10.511	19 33 48.5	+34.81	16 17.23	69.34	11 57.55	0.652
Frid.	23	20 24 11.35	10.478	19 19 42.1	35.70	16 17.13	69.23	12 12.80	0.619
Sat.	24	20 28 22.40	10.444	19 5 14.3	36.59	16 17.02	69.12	12 27.25	0.585
SUN.	25	20 32 32.63	10.409	18 50 25.5	+37.45	16 16.91	69.01	12 40.89	0.551
Mon.	26	20 36 42.03	10.374	18 35 16.3	38.30	16 16.80	68.90	12 53.69	0.516
Tues.	27	20 40 50.59	10.339	18 19 46.9	39.13	16 16.67	68.79	13 5.66	0.481
Wed.	28	20 44 58.32	10.305	18 3 57.6	+39.95	16 16.54	68.68	13 16.80	0.447
Thur.	29	20 49 5.22	10.271	17 47 49.1	40.75	16 16.41	68.57	13 27.12	0.413
Frid.	30	20 53 11.30	10.237	17 31 21.5	41.54	16 16.27	68.45	13 36.62	0.379
Sat.	31	20 57 16.55	10.203	17 14 35.3	42.31	16 16.13	68.34	13 45.30	0.345
SUN.	32	21 1 20.98	10.169	S. 16 57 30.8	+43.06	16 15.98	68.22	13 53.16	0.311

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sidereal time.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Thur.	1	18 <sup>h</sup> 49 <sup>m</sup> 12.52 <sup>s</sup>	11.028	S. 22° 58' 10.7"	+12.96	4 <sup>m</sup> 0.22 <sup>s</sup>	1.171	18 <sup>h</sup> 45 <sup>m</sup> 12.80 <sup>s</sup>
Frid.	2	18 53 37.01	11.013	22 52 46.0	14.10	4 28.14	1.156	18 49 8.66
Sat.	3	18 58 1.13	10.998	22 46 53.8	15.23	4 55.70	1.141	18 53 5.42
SUN.	4	19 2 24.86	10.981	22 40 34.5	+16.36	5 22.87	1.124	18 57 1.98
Mon.	5	19 6 48.17	10.963	22 33 48.3	17.48	5 49.63	1.106	19 0 58.54
Tues.	6	19 11 11.05	10.944	22 26 35.4	18.59	6 15.96	1.087	19 4 55.09
Wed.	7	19 15 33.46	10.924	22 18 55.8	+19.69	6 41.81	1.067	19 8 51.65
Thur.	8	19 19 55.39	10.903	22 10 49.8	20.79	7 7.18	1.046	19 12 48.21
Frid.	9	19 24 16.80	10.881	22 2 17.8	21.88	7 32.03	1.024	19 16 44.77
Sat.	10	19 28 37.66	10.858	21 53 19.9	+22.95	7 56.34	1.001	19 20 41.32
SUN.	11	19 32 57.97	10.834	21 43 56.4	24.01	8 20.09	0.977	19 24 37.88
Mon.	12	19 37 17.68	10.809	21 34 7.6	25.06	8 43.25	0.952	19 28 34.43
Tues.	13	19 41 36.77	10.783	21 23 53.8	+26.10	9 5.78	0.926	19 32 30.99
Wed.	14	19 45 55.23	10.756	21 13 15.2	27.12	9 27.68	0.899	19 36 27.55
Thur.	15	19 50 13.03	10.728	21 2 12.2	28.13	9 48.92	0.871	19 40 24.11
Frid.	16	19 54 30.16	10.699	20 50 45.1	+29.13	10 9.50	0.842	19 44 20.66
Sat.	17	19 58 46.58	10.669	20 38 54.2	30.11	10 29.36	0.812	19 48 17.22
SUN.	18	20 3 2.27	10.638	20 26 39.9	31.08	10 48.50	0.781	19 52 13.77
Mon.	19	20 7 17.21	10.606	20 14 2.5	+32.03	11 6.88	0.749	19 56 10.33
Tues.	20	20 11 31.39	10.574	20 1 2.4	32.97	11 24.51	0.717	20 0 6.88
Wed.	21	20 15 44.80	10.542	19 47 39.8	33.89	11 41.36	0.685	20 4 3.44
Thur.	22	20 19 57.41	10.509	19 33 55.3	+34.80	11 57.42	0.652	20 7 59.99
Frid.	23	20 24 9.22	10.476	19 19 49.2	35.69	12 12.67	0.619	20 11 56.55
Sat.	24	20 28 20.23	10.442	19 5 21.7	36.58	12 27.13	0.585	20 15 53.10
SUN.	25	20 32 30.43	10.408	18 50 33.3	+37.44	12 40.77	0.551	20 19 49.66
Mon.	26	20 36 39.80	10.373	18 35 24.4	38.29	12 53.58	0.516	20 23 46.22
Tues.	27	20 40 48.33	10.338	18 19 55.3	39.12	13 5.55	0.481	20 27 42.78
Wed.	28	20 44 56.04	10.304	18 4 6.4	+39.94	13 16.70	0.447	20 31 39.34
Thur.	29	20 49 2.92	10.270	17 47 58.2	40.74	13 27.03	0.413	20 35 35.89
Frid.	30	20 53 8.98	10.236	17 31 30.9	41.53	13 36.54	0.379	20 39 32.44
Sat.	31	20 57 14.22	10.202	17 14 45.0	42.30	13 45.22	0.345	20 43 29.00
SUN.	32	21 1 18.63	10.168	S. 16 57 40.8	+43.05	13 53.08	0.311	20 47 25.55

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,  
+ 9'.8565.  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.	
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	1	281° 19' 8.7	19' 5.3	152.85	— 0.84	9.9926509	+ 0.4	<sup>h</sup> 5 <sup>m</sup> 13 <sup>s</sup> 56.12	
2	2	282 20 17.0	20 13.5	152.85	0.81	9.9926531	1.5	5 10 0.21	
3	3	283 21 25.4	21 21.7	152.85	0.76	9.9926583	2.7	5 6 4.30	
4	4	284 22 33.8	22 30.0	152.85	— 0.68	9.9926664	+ 3.9	5 2 8.39	
5	5	285 23 42.3	23 38.4	152.85	0.58	9.9926772	5.0	4 58 12.48	
6	6	286 24 50.9	24 46.8	152.86	0.46	9.9926906	6.1	4 54 16.57	
7	7	287 25 59.5	25 55.3	152.86	— 0.33	9.9927065	+ 7.1	4 50 20.66	
8	8	288 27 8.1	27 3.7	152.86	0.19	9.9927248	8.1	4 46 24.74	
9	9	289 28 16.7	28 12.1	152.86	— 0.06	9.9927454	9.0	4 42 28.83	
10	10	290 29 25.3	29 20.6	152.86	+ 0.05	9.9927682	+ 9.9	4 38 32.92	
11	11	291 30 33.9	30 29.0	152.86	0.15	9.9927930	10.7	4 34 37.01	
12	12	292 31 42.3	31 37.3	152.85	0.23	9.9928197	11.5	4 30 41.10	
13	13	293 32 50.5	32 45.3	152.84	+ 0.29	9.9928482	+ 12.2	4 26 45.19	
14	14	294 33 58.4	33 53.0	152.83	0.31	9.9928783	12.9	4 22 49.28	
15	15	295 35 5.9	35 0.3	152.80	0.30	9.9929100	13.6	4 18 53.37	
16	16	296 36 12.9	36 7.2	152.78	+ 0.26	9.9929433	+ 14.2	4 14 57.46	
17	17	297 37 19.3	37 13.5	152.75	0.20	9.9929782	14.9	4 11 1.55	
18	18	298 38 24.9	38 19.0	152.72	0.11	9.9930147	15.5	4 7 5.64	
19	19	299 39 29.7	39 23.6	152.69	+ 0.01	9.9930529	+ 16.2	4 3 9.73	
20	20	300 40 33.7	40 27.3	152.65	— 0.11	9.9930927	17.0	3 59 13.82	
21	21	301 41 36.7	41 30.1	152.61	0.24	9.9931343	17.7	3 55 17.91	
22	22	302 42 38.7	42 31.9	152.56	— 0.37	9.9931777	+ 18.5	3 51 22.00	
23	23	303 43 39.6	43 32.7	152.51	0.50	9.9932231	19.3	3 47 26.09	
24	24	304 44 39.3	44 32.3	152.46	0.62	9.9932705	20.2	3 43 30.18	
25	25	305 45 37.8	45 30.7	152.41	— 0.72	9.9933201	+ 21.1	3 39 34.26	
26	26	306 46 35.3	46 28.0	152.37	0.79	9.9933720	22.1	3 35 38.35	
27	27	307 47 31.6	47 24.2	152.32	0.83	9.9934263	23.1	3 31 42.44	
28	28	308 48 26.7	48 19.2	152.27	— 0.84	9.9934831	+ 24.2	3 27 46.53	
29	29	309 49 20.6	49 13.0	152.22	0.82	9.9935424	25.2	3 23 50.61	
30	30	310 50 13.3	50 5.6	152.17	0.77	9.9936042	26.3	3 19 54.70	
31	31	311 51 4.9	50 57.1	152.13	0.69	9.9936686	27.3	3 15 58.79	
32	32	312 51 55.5	51 47.6	152.09	— 0.59	9.9937355	+ 28.3	3 12 2.90	

NOTE.—The numbers in column  $\lambda$  correspond to the true equinox of the date; in column  $\lambda'$ , to the mean equinox of January 0<sup>h</sup>.0.

Diff. for 1 Hour,  
— 9<sup>h</sup>.8296.  
(Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI- DIAMETER.

## HORIZONTAL PARALLAX.

## UPPER TRANSIT.

## AGE.

Noon.

Midnight.

Noon.

Diff. for  
1 Hour.

Midnight.

Diff. for  
1 Hour.Meridian of  
Greenwich.Diff. for  
1 Hour.

Noon.

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	16' 43".7	16' 40".7	61' 17".0	- 0.72	61' 6".0	- 1.11	<sup>h</sup> 12 50.1 <sup>m</sup>	<sup>m</sup> 2.54	<sup>d</sup> 14.9
2	16 36.5	16 31.1	60 50.4	1.47	60 30.7	1.78	13 49.6	2.42	15.9
3	16 24.8	16 17.8	60 7.6	2.04	59 41.7	2.23	14 45.6	2.26	16.9
4	16 10.2	16 2.2	59 13.8	- 2.37	58 44.7	- 2.45	15 38.1	2.12	17.9
5	15 54.1	15 46.1	58 15.0	2.47	57 45.5	2.43	16 27.7	2.01	18.9
6	15 38.2	15 30.7	57 16.6	2.36	56 48.8	2.25	17 15.1	1.94	19.9
7	15 23.5	15 16.9	56 22.6	- 2.11	55 58.2	- 1.94	18 1.0	1.90	20.9
8	15 10.8	15 5.4	55 35.9	1.76	55 15.8	1.57	18 46.4	1.89	21.9
9	15 0.5	14 56.4	54 58.1	1.37	54 42.8	1.17	19 31.8	1.90	22.9
10	14 52.8	14 49.9	54 29.8	- 0.98	54 19.1	- 0.79	20 17.6	1.92	23.9
11	14 47.7	14 46.0	54 10.8	0.60	54 4.6	0.43	21 4.0	1.95	24.9
12	14 44.8	14 44.2	54 0.4	- 0.27	53 58.2	- 0.11	21 51.0	1.97	25.9
13	14 44.1	14 44.5	53 57.8	+ 0.04	53 59.1	+ 0.17	22 38.5	1.98	26.9
14	14 45.2	14 46.4	54 1.9	0.20	54 6.1	0.40	23 26.0	1.98	27.9
15	14 47.9	14 49.7	54 11.6	0.51	54 18.3	0.60	6		28.9
16	14 51.8	14 54.2	54 26.1	+ 0.60	54 34.9	+ 0.77	0 13.2	1.96	0.1
17	14 56.9	14 59.8	54 44.7	0.86	54 55.5	0.93	1 0.0	1.93	1.1
18	15 3.0	15 6.4	55 7.2	1.01	55 19.8	1.09	1 46.1	1.91	2.1
19	15 10.1	15 14.1	55 33.4	+ 1.17	55 48.0	+ 1.25	2 31.9	1.90	3.1
20	15 18.3	15 22.8	56 3.5	1.33	56 20.0	1.42	3 17.7	1.91	4.1
21	15 27.6	15 32.6	56 37.5	1.49	56 55.9	1.57	4 4.0	1.95	5.1
22	15 37.9	15 43.4	57 15.3	+ 1.65	57 35.5	+ 1.71	4 51.6	2.02	6.1
23	15 49.0	15 54.8	57 56.2	1.74	58 17.4	1.77	5 41.2	2.12	7.1
24	16 0.6	16 6.4	58 38.8	1.77	59 0.0	1.74	6 33.5	2.24	8.1
25	16 12.0	16 17.3	59 20.6	+ 1.67	59 40.2	+ 1.57	7 28.9	2.38	9.1
26	16 22.2	16 26.6	59 58.2	1.42	60 14.2	1.22	8 27.2	2.49	10.1
27	16 30.2	16 33.0	60 27.5	0.98	60 37.7	0.70	9 27.8	2.55	11.1
28	16 34.8	16 35.6	60 44.3	+ 0.39	60 47.1	+ 0.06	10 29.1	2.54	12.1
29	16 35.2	16 33.6	60 45.6	- 0.30	60 39.9	- 0.65	11 29.5	2.48	13.1
30	16 30.9	16 27.1	60 30.0	0.99	60 16.1	1.31	12 27.6	2.36	14.1
31	16 22.3	16 16.7	59 58.5	1.60	59 37.8	1.84	13 22.9	2.24	15.1
32	16 10.3	16 3.4	59 14.4	- 2.03	58 49.0	- 2.17	14 15.3	2.13	16.1

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 1.					SATURDAY 3.				
0	h m s	s	N. 17° 38' 27.9"	3.290	0	h m s	s	N. 12° 24' 53.7"	8.747
1	7 6 21.44	2.6463	17 34 34.8	3.951	1	9 8 24.06	2.4180	12 16 6.8	8.816
2	7 9 0.13	2.6433	17 30 33.8	4.081	2	9 10 48.97	2.4193	12 7 15.8	8.884
3	7 11 38.63	2.6401	17 26 25.1	4.300	3	9 13 13.54	2.4067	11 58 20.7	8.951
4	7 14 16.94	2.6367	17 22 8.7	4.337	4	9 15 37.77	2.4011	11 49 21.7	9.015
5	7 16 55.04	2.6333	17 17 44.7	4.463	5	9 18 1.67	2.3955	11 40 18.9	9.078
6	7 19 32.94	2.6299	17 13 13.2	4.588	6	9 20 25.23	2.3898	11 31 12.3	9.141
7	7 22 10.63	2.6263	17 8 34.2	4.713	7	9 22 48.45	2.3842	11 22 2.0	9.201
8	7 24 48.10	2.6227	17 3 47.7	4.837	8	9 25 11.34	2.3786	11 12 48.2	9.259
9	7 27 25.35	2.6189	16 58 53.8	4.959	9	9 27 33.89	2.3730	11 3 30.9	9.317
10	7 30 2.37	2.6150	16 53 52.6	5.081	10	9 29 56.10	2.3674	10 54 10.1	9.374
11	7 32 39.15	2.6110	16 48 44.1	5.202	11	9 32 17.98	2.3618	10 44 46.0	9.428
12	7 35 15.69	2.6069	16 43 28.4	5.321	12	9 34 39.52	2.3562	10 35 18.7	9.482
13	7 37 51.98	2.6028	16 38 5.6	5.439	13	9 37 0.73	2.3507	10 25 48.2	9.534
14	7 40 28.03	2.5987	16 32 35.8	5.556	14	9 39 21.61	2.3452	10 16 14.6	9.584
15	7 43 3.83	2.5945	16 26 58.9	5.672	15	9 41 42.15	2.3396	10 6 38.1	9.633
16	7 45 39.37	2.5901	16 21 15.1	5.787	16	9 44 2.36	2.3342	9 56 58.7	9.681
17	7 48 14.64	2.5856	16 15 24.5	5.899	17	9 46 22.25	2.3287	9 47 16.4	9.728
18	7 50 49.64	2.5811	16 9 27.2	6.011	18	9 48 41.81	2.3232	9 37 31.3	9.773
19	7 53 24.37	2.5765	16 3 23.2	6.122	19	9 51 1.04	2.3178	9 27 43.6	9.817
20	7 55 58.82	2.5719	15 57 12.5	6.232	20	9 53 19.95	2.3124	9 17 53.3	9.859
21	7 58 33.00	2.5672	15 50 55.3	6.341	21	9 55 38.53	2.3070	9 8 0.5	9.900
22	8 1 6.89	2.5624	15 44 31.6	6.448	22	9 57 56.79	2.3017	8 58 5.3	9.940
23	8 3 40.49	2.5576	N. 15° 38' 1.5"	6.554	23	10 0 14.73	2.2964	N. 8° 48' 7.7"	9.979
FRIDAY 2.					SUNDAY 4.				
0	8 6 13.80	2.5527	N. 15° 31' 25.1"	6.658	0	10 2 32.36	2.2919	N. 8° 38' 7.9"	10.015
1	8 8 46.81	2.5478	15 24 42.5	6.762	1	10 4 49.67	2.2869	8 28 5.9	10.051
2	8 11 19.53	2.5428	15 17 53.7	6.864	2	10 7 6.66	2.2806	8 18 1.8	10.086
3	8 13 51.95	2.5377	15 10 58.8	6.964	3	10 9 23.34	2.2754	8 7 55.6	10.119
4	8 16 24.06	2.5326	15 3 58.0	7.063	4	10 11 39.71	2.2703	7 57 47.5	10.151
5	8 18 55.86	2.5275	14 56 51.3	7.161	5	10 13 55.77	2.2652	7 47 37.5	10.182
6	8 21 27.36	2.5223	14 49 38.7	7.257	6	10 16 11.53	2.2601	7 37 25.7	10.211
7	8 23 58.54	2.5170	14 42 20.4	7.352	7	10 18 26.98	2.2550	7 27 12.2	10.239
8	8 26 29.40	2.5118	14 34 56.4	7.446	8	10 20 42.13	2.2500	7 16 57.0	10.267
9	8 28 59.95	2.5065	14 27 26.9	7.538	9	10 22 56.98	2.2450	7 6 40.2	10.293
10	8 31 30.18	2.5011	14 19 51.9	7.629	10	10 25 11.53	2.2401	6 56 21.9	10.317
11	8 34 0.08	2.4957	14 12 11.4	7.718	11	10 27 25.79	2.2352	6 46 2.2	10.339
12	8 36 29.66	2.4902	14 4 25.7	7.805	12	10 29 39.75	2.2303	6 35 41.2	10.361
13	8 38 58.91	2.4848	13 56 34.8	7.892	13	10 31 53.43	2.2256	6 25 18.9	10.382
14	8 41 27.84	2.4794	13 48 38.7	7.978	14	10 34 6.82	2.2208	6 14 55.3	10.403
15	8 43 56.44	2.4739	13 40 37.5	8.062	15	10 36 19.92	2.2160	6 4 30.5	10.422
16	8 46 24.71	2.4683	13 32 31.3	8.143	16	10 38 32.74	2.2113	5 54 4.6	10.439
17	8 48 52.64	2.4627	13 24 20.3	8.223	17	10 40 45.28	2.2067	5 43 37.8	10.455
18	8 51 20.24	2.4572	13 16 4.5	8.303	18	10 42 57.55	2.2022	5 33 10.0	10.471
19	8 53 47.51	2.4517	13 7 44.0	8.381	19	10 45 9.54	2.1976	5 22 41.3	10.485
20	8 56 14.44	2.4461	12 59 18.8	8.457	20	10 47 21.26	2.1931	5 12 11.8	10.498
21	8 58 41.04	2.4405	12 50 49.1	8.532	21	10 49 32.71	2.1887	5 1 41.6	10.510
22	9 1 7.30	2.4348	12 42 15.0	8.605	22	10 51 43.90	2.1842	4 51 10.6	10.521
23	9 3 33.22	2.4292	12 33 36.5	8.677	23	10 53 54.82	2.1798	4 40 39.0	10.531
24	9 5 58.81	2.4237	N. 12° 24' 53.7"	8.747	24	10 56 5.48	2.1756	N. 4° 30' 6.9"	10.539



## ·GREENWICH MEAN TIME.

## ·THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 5.					WEDNESDAY 7.				
0	10 56 5.48	2.1756	N. 4 30' 6.9	10.539	0	12 36 31.75	2.0224	S. 3 48' 26.6	9.924
1	10 58 15.89	2.1713	4 19 34.3	10.547	1	12 38 33.46	2.0277	3 58 21.1	9.893
2	11 0 26.04	2.1671	4 9 1.2	10.555	2	12 40 35.07	2.0320	4 8 13.7	9.862
3	11 2 35.94	2.1629	3 58 27.7	10.561	3	12 42 36.58	2.0363	4 18 4.5	9.830
4	11 4 45.59	2.1588	3 47 53.9	10.565	4	12 44 37.99	2.0327	4 27 53.3	9.797
5	11 6 55.00	2.1547	3 37 19.9	10.568	5	12 46 39.30	2.0310	4 37 40.1	9.763
6	11 9 4.16	2.1507	3 26 45.7	10.571	6	12 48 40.51	2.0195	4 47 24.9	9.729
7	11 11 13.09	2.1468	3 16 11.4	10.573	7	12 50 41.64	2.0181	4 57 7.6	9.695
8	11 13 21.78	2.1428	3 5 37.0	10.574	8	12 52 42.68	2.0166	5 6 48.3	9.661
9	11 15 30.23	2.1389	2 55 2.5	10.575	9	12 54 43.63	2.0159	5 16 26.9	9.626
10	11 17 38.45	2.1351	2 44 28.0	10.573	10	12 56 44.50	2.0139	5 26 3.3	9.588
11	11 19 46.45	2.1314	2 33 53.7	10.570	11	12 58 45.30	2.0127	5 35 37.5	9.552
12	11 21 54.22	2.1277	2 23 19.6	10.567	12	13 0 46.02	2.0114	5 45 9.6	9.516
13	11 24 1.77	2.1241	2 12 45.7	10.563	13	13 2 46.66	2.0102	5 54 39.4	9.477
14	11 26 9.11	2.1205	2 2 12.0	10.559	14	13 4 47.24	2.0091	6 4 6.9	9.438
15	11 28 16.23	2.1169	1 51 38.6	10.553	15	13 6 47.75	2.0079	6 13 32.0	9.399
16	11 30 23.14	2.1134	1 41 5.6	10.547	16	13 8 48.19	2.0068	6 22 54.8	9.360
17	11 32 29.84	2.1100	1 30 33.0	10.540	17	13 10 48.57	2.0058	6 32 15.2	9.321
18	11 34 36.34	2.1067	1 20 0.8	10.532	18	13 12 48.89	2.0048	6 41 33.3	9.281
19	11 36 42.64	2.1033	1 9 29.1	10.529	19	13 14 49.15	2.0039	6 50 48.9	9.239
20	11 38 48.74	2.1000	0 58 58.1	10.519	20	13 16 49.36	2.0031	7 0 2.0	9.197
21	11 40 54.64	2.0967	0 48 27.7	10.501	21	13 18 49.52	2.0022	7 9 12.6	9.155
22	11 43 0.35	2.0936	0 37 58.0	10.489	22	13 20 49.63	2.0014	7 18 20.6	9.112
23	11 45 5.87	2.0905	N. 0 27 29.0	10.477	23	13 22 49.69	2.0006	S. 7 27 26.1	9.070
TUESDAY 6.					THURSDAY 8.				
0	11 47 11.21	2.0875	N. 0 17 0.8	10.463	0	13 24 49.70	1.9998	S. 7 36 29.0	9.027
1	11 49 16.37	2.0845	N. 0 6 33.4	10.449	1	13 26 49.67	1.9993	7 45 29.3	8.983
2	11 51 21.35	2.0815	S. 0 3 53.1	10.434	2	13 28 49.61	1.9987	7 54 26.9	8.938
3	11 53 26.15	2.0785	0 14 18.7	10.419	3	13 30 49.51	1.9981	8 3 21.8	8.893
4	11 55 30.77	2.0756	0 24 43.4	10.402	4	13 32 49.38	1.9975	8 12 14.0	8.848
5	11 57 35.22	2.0728	0 35 7.0	10.385	5	13 34 49.21	1.9969	8 21 3.5	8.803
6	11 59 39.51	2.0701	0 45 29.6	10.367	6	13 36 49.01	1.9965	8 29 50.2	8.755
7	12 1 43.63	2.0674	0 55 51.1	10.348	7	13 38 48.79	1.9961	8 38 34.1	8.708
8	12 3 47.59	2.0648	1 6 11.1	10.328	8	13 40 48.54	1.9957	8 47 15.1	8.660
9	12 5 51.40	2.0623	1 16 30.5	10.308	9	13 42 48.27	1.9953	8 55 53.3	8.612
10	12 7 55.06	2.0597	1 26 48.4	10.288	10	13 44 47.98	1.9950	9 4 28.6	8.564
11	12 9 58.56	2.0571	1 37 5.1	10.267	11	13 46 47.67	1.9948	9 13 1.0	8.516
12	12 12 1.91	2.0546	1 47 20.5	10.245	12	13 48 47.35	1.9946	9 21 30.5	8.467
13	12 14 5.11	2.0523	1 57 34.5	10.221	13	13 50 47.02	1.9943	9 29 57.0	8.417
14	12 16 8.18	2.0500	2 7 47.0	10.197	14	13 52 46.67	1.9941	9 38 20.5	8.366
15	12 18 11.11	2.0477	2 17 58.1	10.172	15	13 54 46.31	1.9939	9 46 40.9	8.315
16	12 20 13.91	2.0455	2 28 7.7	10.147	16	13 56 45.94	1.9938	9 54 58.3	8.265
17	12 22 16.57	2.0433	2 38 15.8	10.122	17	13 58 45.57	1.9938	10 3 12.7	8.214
18	12 24 19.10	2.0412	2 48 22.4	10.096	18	14 0 45.20	1.9938	10 11 24.0	8.162
19	12 26 21.51	2.0391	2 58 27.3	10.069	19	14 2 44.83	1.9938	10 19 32.1	8.109
20	12 28 23.79	2.0370	3 8 30.6	10.041	20	14 4 44.46	1.9938	10 27 37.0	8.056
21	12 30 25.95	2.0351	3 18 32.2	10.012	21	14 6 44.09	1.9939	10 35 38.8	8.003
22	12 32 28.00	2.0332	3 28 32.1	9.983	22	14 8 43.73	1.9941	10 43 37.4	7.949
23	12 34 29.93	2.0313	3 38 30.2	9.954	23	14 10 43.38	1.9943	10 51 32.7	7.895
24	12 36 31.75	2.0294	S. 3 48 26.6	9.924	24	14 12 43.04	1.9944	S. 10 59 24.8	7.841

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 9.					SUNDAY 11.				
0	14 12 43.04	1.0044	S. 10° 59' 24.8"	7.841	0	15 49 7.10	2.0000	S. 16° 5' 14.0"	4.758
1	14 14 42.71	1.0046	11 7 13.6	7.786	1	15 51 8.88	2.0300	16 9 57.3	4.685
2	14 16 42.39	1.0048	11 14 59.1	7.730	2	15 53 10.73	2.0313	16 14 36.2	4.619
3	14 18 42.09	1.0051	11 22 41.2	7.674	3	15 55 12.64	2.0323	16 19 10.7	4.538
4	14 20 41.81	1.0054	11 30 20.0	7.618	4	15 57 14.61	2.0334	16 23 40.8	4.464
5	14 22 41.54	1.0057	11 37 55.4	7.561	5	15 59 16.65	2.0345	16 28 6.4	4.389
6	14 24 41.29	1.0061	11 45 27.3	7.503	6	16 1 18.75	2.0355	16 32 27.5	4.314
7	14 26 41.07	1.0065	11 52 55.8	7.445	7	16 3 20.91	2.0366	16 36 44.1	4.240
8	14 28 40.87	1.0068	12 0 20.8	7.389	8	16 5 23.14	2.0377	16 40 56.3	4.166
9	14 30 40.69	1.0072	12 7 42.4	7.330	9	16 7 25.43	2.0387	16 45 4.0	4.090
10	14 32 40.54	1.0077	12 15 0.4	7.271	10	16 9 27.78	2.0397	16 49 7.1	4.014
11	14 34 40.42	1.0082	12 22 14.9	7.212	11	16 11 30.19	2.0407	16 53 5.7	3.938
12	14 36 40.32	1.0087	12 29 25.9	7.153	12	16 13 32.67	2.0418	16 56 59.7	3.862
13	14 38 40.26	1.0092	12 36 33.3	7.093	13	16 15 35.21	2.0429	17 0 49.1	3.785
14	14 40 40.23	1.0098	12 43 37.0	7.032	14	16 17 37.82	2.0439	17 4 33.9	3.708
15	14 42 40.24	2.0004	12 50 37.1	6.972	15	16 19 40.48	2.0449	17 8 14.1	3.632
16	14 44 40.28	2.0010	12 57 33.6	6.911	16	16 21 43.20	2.0459	17 11 49.7	3.554
17	14 46 40.36	2.0017	13 4 26.4	6.849	17	16 23 45.99	2.0470	17 15 20.6	3.476
18	14 48 40.48	2.0023	13 11 15.5	6.787	18	16 25 48.84	2.0480	17 18 46.8	3.398
19	14 50 40.64	2.0030	13 18 0.9	6.725	19	16 27 51.75	2.0490	17 22 8.3	3.320
20	14 52 40.84	2.0037	13 24 42.5	6.662	20	16 29 54.72	2.0500	17 25 25.2	3.242
21	14 54 41.08	2.0044	13 31 20.3	6.598	21	16 31 57.75	2.0510	17 28 37.4	3.163
22	14 56 41.37	2.0051	13 37 54.3	6.535	22	16 34 0.84	2.0520	17 31 44.8	3.084
23	14 58 41.70	2.0058	S. 13° 44' 24.5"	6.472	23	16 36 3.99	2.0530	S. 17° 34' 47.5"	3.005
SATURDAY 10.					MONDAY 12.				
0	15 0 42.07	2.0066	S. 13° 50' 50.9"	6.408	0	16 38 7.20	2.0540	S. 17° 37' 45.4"	2.925
1	15 2 42.49	2.0074	13 57 13.4	6.343	1	16 40 10.47	2.0549	17 40 38.5	2.846
2	15 4 42.96	2.0080	14 3 32.0	6.276	2	16 42 13.79	2.0558	17 43 26.9	2.767
3	15 6 43.48	2.0086	14 9 46.7	6.213	3	16 44 17.17	2.0568	17 46 10.5	2.686
4	15 8 44.04	2.0092	14 15 57.5	6.147	4	16 46 20.61	2.0577	17 48 49.2	2.605
5	15 10 44.66	2.0107	14 22 4.3	6.081	5	16 48 24.10	2.0587	17 51 23.1	2.525
6	15 12 45.33	2.0116	14 28 7.2	6.015	6	16 50 27.65	2.0596	17 53 52.2	2.444
7	15 14 46.05	2.0125	14 34 6.1	5.947	7	16 52 31.25	2.0604	17 56 16.4	2.363
8	15 16 46.83	2.0134	14 40 0.9	5.879	8	16 54 34.90	2.0613	17 58 35.7	2.282
9	15 18 47.66	2.0143	14 45 51.6	5.812	9	16 56 38.61	2.0622	18 0 50.2	2.201
10	15 20 48.55	2.0152	14 51 38.3	5.744	10	16 58 42.37	2.0631	18 2 59.8	2.119
11	15 22 49.49	2.0160	14 57 20.9	5.676	11	17 0 46.18	2.0639	18 5 4.5	2.038
12	15 24 50.49	2.0170	15 2 59.5	5.608	12	17 2 50.04	2.0648	18 7 4.3	1.956
13	15 26 51.55	2.0180	15 8 33.9	5.539	13	17 4 53.95	2.0656	18 8 59.2	1.873
14	15 28 52.67	2.0191	15 14 4.2	5.470	14	17 6 57.91	2.0663	18 10 49.1	1.791
15	15 30 53.84	2.0200	15 19 30.3	5.400	15	17 9 1.91	2.0671	18 12 34.1	1.708
16	15 32 55.07	2.0210	15 24 52.2	5.330	16	17 11 5.96	2.0679	18 14 14.1	1.625
17	15 34 56.36	2.0220	15 30 9.9	5.259	17	17 13 10.06	2.0687	18 15 49.2	1.543
18	15 36 57.71	2.0230	15 35 29.3	5.188	18	17 15 14.20	2.0693	18 17 19.3	1.460
19	15 38 59.12	2.0240	15 40 32.5	5.117	19	17 17 18.38	2.0700	18 18 44.4	1.377
20	15 41 0.59	2.0250	15 45 37.4	5.046	20	17 19 22.60	2.0708	18 20 4.5	1.293
21	15 43 2.12	2.0261	15 50 38.0	4.974	21	17 21 26.87	2.0715	18 21 19.6	1.210
22	15 45 3.72	2.0272	15 55 34.3	4.903	22	17 23 31.18	2.0721	18 22 29.7	1.127
23	15 47 5.38	2.0282	16 0 26.3	4.831	23	17 25 35.52	2.0727	18 23 34.8	1.043
24	15 49 7.10	2.0292	S. 16° 5' 14.0"	4.758	24	17 27 39.90	2.0733	S. 18° 24' 34.9"	0.959

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 13.					THURSDAY 15.				
0	17 27 39.90	2.0733	S. 18° 24' 34.9"	0.369	0	19 7 28.70	2.0733	S. 17° 33' 24.0"	3.076
1	17 29 44.32	2.0739	18 25 29.9	0.875	1	19 9 33.30	2.0734	17 30 17.0	3.157
2	17 31 48.77	2.0745	18 26 19.9	0.792	2	19 11 37.87	2.0739	17 27 5.1	3.339
3	17 33 53.26	2.0751	18 27 4.9	0.708	3	19 13 42.41	2.0754	17 23 48.3	3.321
4	17 35 57.78	2.0756	18 27 44.8	0.623	4	19 15 46.92	2.0749	17 20 26.6	3.403
5	17 38 2.33	2.0761	18 28 19.7	0.539	5	19 17 51.40	2.0743	17 17 0.1	3.483
6	17 40 6.91	2.0766	18 28 49.5	0.455	6	19 19 55.84	2.0738	17 13 28.7	3.563
7	17 42 11.52	2.0771	18 29 14.3	0.371	7	19 22 0.25	2.0732	17 9 52.5	3.643
8	17 44 16.16	2.0775	18 29 34.0	0.286	8	19 24 4.62	2.0726	17 6 11.5	3.723
9	17 46 20.82	2.0779	18 29 48.6	0.201	9	19 26 8.96	2.0720	17 2 25.7	3.803
10	17 48 25.51	2.0783	18 29 58.1	0.117	10	19 28 13.26	2.0713	16 58 35.1	3.883
11	17 50 30.22	2.0787	18 30 2.6	- 0.032	11	19 30 17.52	2.0707	16 54 39.8	3.963
12	17 52 34.95	2.0790	18 30 2.0	+ 0.052	12	19 32 21.75	2.0701	16 50 39.7	4.041
13	17 54 39.70	2.0793	18 29 56.3	0.137	13	19 34 25.93	2.0694	16 46 34.9	4.120
14	17 56 44.47	2.0797	18 29 45.5	0.222	14	19 36 30.07	2.0687	16 42 25.3	4.199
15	17 58 49.27	2.0801	18 29 29.6	0.307	15	19 38 34.17	2.0679	16 38 11.0	4.277
16	18 0 54.08	2.0804	18 29 8.6	0.392	16	19 40 38.22	2.0673	16 33 52.1	4.354
17	18 2 58.91	2.0806	18 28 42.6	0.476	17	19 42 42.23	2.0665	16 29 28.5	4.430
18	18 5 3.75	2.0807	18 28 11.5	0.561	18	19 44 46.20	2.0657	16 25 0.3	4.509
19	18 7 8.60	2.0809	18 27 35.3	0.646	19	19 46 50.12	2.0649	16 20 27.4	4.586
20	18 9 13.46	2.0812	18 26 54.0	0.731	20	19 48 53.99	2.0643	16 15 49.9	4.662
21	18 11 18.34	2.0814	18 26 7.6	0.816	21	19 50 57.82	2.0634	16 11 7.9	4.738
22	18 13 23.23	2.0815	18 25 16.1	0.901	22	19 53 1.60	2.0626	16 6 21.3	4.814
23	18 15 28.12	2.0815	S. 18° 24' 19.5"	0.986	23	19 55 5.33	2.0617	S. 16° 1' 30.2"	4.890
WEDNESDAY 14.					FRIDAY 16.				
0	18 17 33.01	2.0816	S. 18° 23' 17.8"	1.071	0	19 57 9.01	2.0609	S. 15° 56' 34.5"	4.966
1	18 19 37.91	2.0817	18 22 11.0	1.155	1	19 59 12.64	2.0601	15 51 34.3	5.041
2	18 21 42.81	2.0817	18 20 59.2	1.239	2	20 1 16.22	2.0593	15 46 29.6	5.115
3	18 23 47.72	2.0818	18 19 42.3	1.324	3	20 3 19.75	2.0584	15 41 20.5	5.188
4	18 25 52.63	2.0818	18 18 20.3	1.409	4	20 5 23.23	2.0576	15 36 7.0	5.262
5	18 27 57.54	2.0817	18 16 53.2	1.493	5	20 7 26.68	2.0567	15 30 49.0	5.337
6	18 30 2.44	2.0817	18 15 21.1	1.577	6	20 9 30.03	2.0558	15 25 26.6	5.410
7	18 32 7.34	2.0816	18 13 43.9	1.662	7	20 11 33.35	2.0549	15 19 59.8	5.483
8	18 34 12.23	2.0814	18 12 1.7	1.746	8	20 13 36.62	2.0541	15 14 28.7	5.554
9	18 36 17.11	2.0813	18 10 14.4	1.830	9	20 15 39.84	2.0532	15 8 53.3	5.626
10	18 38 21.99	2.0812	18 8 22.1	1.914	10	20 17 43.00	2.0523	15 3 13.6	5.697
11	18 40 26.86	2.0811	18 6 24.7	1.998	11	20 19 46.11	2.0513	14 57 29.6	5.768
12	18 42 31.72	2.0809	18 4 22.3	2.082	12	20 21 49.16	2.0504	14 51 41.4	5.839
13	18 44 36.57	2.0807	18 2 14.9	2.166	13	20 23 52.16	2.0495	14 45 48.9	5.910
14	18 46 41.40	2.0804	18 0 2.4	2.250	14	20 25 55.10	2.0486	14 39 52.2	5.979
15	18 48 46.22	2.0802	17 57 44.9	2.333	15	20 27 57.99	2.0477	14 33 51.4	6.048
16	18 50 51.02	2.0799	17 55 22.4	2.416	16	20 30 0.82	2.0467	14 27 46.4	6.117
17	18 52 55.80	2.0796	17 52 55.0	2.499	17	20 32 3.60	2.0458	14 21 37.3	6.186
18	18 55 0.57	2.0793	17 50 22.6	2.582	18	20 34 6.32	2.0449	14 15 24.1	6.254
19	18 57 5.32	2.0789	17 47 45.2	2.665	19	20 36 8.99	2.0440	14 9 6.8	6.321
20	18 59 10.04	2.0785	17 45 2.8	2.747	20	20 38 11.60	2.0430	14 2 45.5	6.388
21	19 1 14.74	2.0782	17 42 15.5	2.830	21	20 40 14.15	2.0421	13 56 20.2	6.455
22	19 3 19.42	2.0778	17 39 23.3	2.912	22	20 42 16.65	2.0412	13 49 50.9	6.522
23	19 5 24.07	2.0773	17 36 26.1	2.994	23	20 44 19.10	2.0403	13 43 17.6	6.587
24	19 7 28.70	2.0769	S. 17° 33' 24.0"	3.076	24	20 46 21.49	2.0394	S. 13° 36' 40.4"	6.652

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 17.					MONDAY 19.				
0	20 46 21.49	2.0384	S. 13° 36' 40.4	6.652	0	22 23 22.68	2.0097	S. 7° 12' 1.0	9.159
1	20 48 23.83	2.0385	13 29 59.3	6.717	1	22 25 23.26	2.0097	7 2 50.3	9.197
2	20 50 26.11	2.0375	13 23 14.3	6.782	2	22 27 23.84	2.0096	6 53 37.3	9.235
3	20 52 28.33	2.0386	13 16 25.5	6.845	3	22 29 24.41	2.0095	6 44 22.1	9.271
4	20 54 30.50	2.0357	13 9 32.9	6.908	4	22 31 24.98	2.0096	6 35 4.8	9.307
5	20 56 32.62	2.0348	13 2 36.5	6.971	5	22 33 25.56	2.0097	6 25 45.3	9.342
6	20 58 34.68	2.0339	12 55 36.3	7.034	6	22 35 26.14	2.0097	6 16 23.7	9.377
7	21 0 36.69	2.0331	12 48 32.4	7.096	7	22 37 26.72	2.0098	6 7 0.1	9.411
8	21 2 38.65	2.0322	12 41 24.8	7.157	8	22 39 27.31	2.0099	5 57 34.4	9.445
9	21 4 40.55	2.0313	12 34 13.5	7.218	9	22 41 27.91	2.0101	5 48 6.7	9.478
10	21 6 42.40	2.0304	12 26 58.6	7.278	10	22 43 28.52	2.0103	5 38 37.0	9.510
11	21 8 44.20	2.0296	12 19 40.1	7.338	11	22 45 29.15	2.0106	5 29 5.5	9.541
12	21 10 45.95	2.0287	12 12 18.0	7.397	12	22 47 29.79	2.0108	5 19 32.1	9.572
13	21 12 47.65	2.0279	12 4 52.4	7.456	13	22 49 30.45	2.0111	5 9 56.8	9.602
14	21 14 49.30	2.0271	11 57 23.3	7.515	14	22 51 31.13	2.0114	5 0 19.8	9.631
15	21 16 50.90	2.0262	11 49 50.6	7.573	15	22 53 31.82	2.0117	4 50 41.1	9.659
16	21 18 52.45	2.0254	11 42 14.5	7.630	16	22 55 32.54	2.0122	4 41 0.7	9.688
17	21 20 53.95	2.0247	11 34 35.0	7.686	17	22 57 33.29	2.0127	4 31 18.6	9.716
18	21 22 55.41	2.0239	11 26 52.2	7.742	18	22 59 34.07	2.0132	4 21 34.8	9.743
19	21 24 56.82	2.0232	11 19 6.0	7.797	19	23 1 34.88	2.0137	4 11 49.4	9.769
20	21 26 58.19	2.0224	11 11 16.5	7.853	20	23 3 35.72	2.0143	4 2 2.5	9.794
21	21 28 59.51	2.0217	11 3 23.6	7.908	21	23 5 36.60	2.0149	3 52 14.1	9.819
22	21 31 0.79	2.0210	10 55 27.5	7.961	22	23 7 37.51	2.0156	3 42 24.2	9.843
23	21 33 2.03	2.0203	S. 10 47 28.2	8.014	23	23 9 38.47	2.0163	S. 3 32 32.9	9.866
SUNDAY 18.					TUESDAY 20.				
0	21 35 3.22	2.0195	S. 10 39 25.8	8.067	0	23 11 39.47	2.0170	S. 3 22 40.3	9.888
1	21 37 4.37	2.0189	10 31 20.2	8.119	1	23 13 40.51	2.0178	3 12 46.3	9.911
2	21 39 5.49	2.0183	10 23 11.5	8.172	2	23 15 41.60	2.0186	3 2 51.0	9.932
3	21 41 6.57	2.0177	10 14 59.6	8.223	3	23 17 42.74	2.0194	2 52 54.4	9.953
4	21 43 7.61	2.0170	10 6 44.7	8.273	4	23 19 43.93	2.0203	2 42 56.6	9.973
5	21 45 8.61	2.0164	9 58 26.8	8.322	5	23 21 45.18	2.0212	2 32 57.7	9.992
6	21 47 9.58	2.0159	9 50 6.0	8.372	6	23 23 46.48	2.0222	2 22 57.6	10.011
7	21 49 10.52	2.0154	9 41 42.2	8.421	7	23 25 47.84	2.0232	2 12 56.4	10.028
8	21 51 11.43	2.0148	9 33 15.5	8.470	8	23 27 49.26	2.0243	2 2 54.2	10.045
9	21 53 12.30	2.0143	9 24 45.8	8.518	9	23 29 50.75	2.0254	1 52 51.0	10.062
10	21 55 13.14	2.0138	9 16 13.3	8.564	10	23 31 52.31	2.0266	1 42 46.8	10.077
11	21 57 13.96	2.0134	9 7 38.1	8.610	11	23 33 53.94	2.0278	1 32 41.7	10.092
12	21 59 14.75	2.0129	8 59 0.1	8.656	12	23 35 55.64	2.0290	1 22 35.8	10.106
13	22 1 15.51	2.0125	8 50 19.3	8.702	13	23 37 57.42	2.0302	1 12 29.0	10.120
14	22 3 16.25	2.0122	8 41 35.8	8.747	14	23 39 59.27	2.0315	1 2 21.4	10.133
15	22 5 16.97	2.0118	8 32 49.7	8.790	15	23 42 1.20	2.0329	0 52 13.0	10.145
16	22 7 17.67	2.0115	8 24 1.0	8.833	16	23 44 3.22	2.0343	0 42 4.0	10.156
17	22 9 18.35	2.0112	8 15 9.7	8.876	17	23 46 5.32	2.0357	0 31 54.3	10.167
18	22 11 19.01	2.0108	8 6 15.8	8.919	18	23 48 7.51	2.0372	0 21 44.0	10.177
19	22 13 19.65	2.0106	7 57 19.4	8.961	19	23 50 9.79	2.0388	0 11 33.1	10.186
20	22 15 20.28	2.0104	7 48 20.5	9.002	20	23 52 12.17	2.0404	S. 0 1 21.7	10.194
21	22 17 20.90	2.0102	7 39 19.2	9.042	21	23 54 14.64	2.0420	N. 0 8 50.1	10.201
22	22 19 21.50	2.0099	7 30 15.5	9.082	22	23 56 17.21	2.0437	0 19 2.4	10.208
23	22 21 22.09	2.0096	7 21 9.4	9.121	23	23 58 19.89	2.0455	0 29 15.1	10.214
24	22 23 22.68	2.0097	S. 7 12 1.0	9.159	24	0 0 22.67	2.0473	N. 0 39 28.1	10.219

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 21.					FRIDAY 23.				
0	0 0 22.67	2.0473	N. 0 39' 28.1"	10.319	0	1 41 35.04	2.1877	N. 8 40' 28.8"	9.486
1	0 2 23.56	2.0491	0 49 41.4	10.324	1	1 43 46.42	2.1917	8 49 56.8	9.447
2	0 4 28.56	2.0508	0 59 55.0	10.328	2	1 45 58.04	2.1957	8 59 22.5	9.408
3	0 6 31.67	2.0526	1 10 8.8	10.331	3	1 48 9.91	2.1998	9 8 45.8	9.368
4	0 8 34.90	2.0548	1 20 22.7	10.333	4	1 50 22.02	2.2039	9 18 6.7	9.327
5	0 10 38.25	2.0568	1 30 36.7	10.334	5	1 52 34.38	2.2082	9 27 25.1	9.285
6	0 12 41.71	2.0588	1 40 50.8	10.335	6	1 54 47.00	2.2124	9 36 40.9	9.243
7	0 14 45.30	2.0609	1 51 4.9	10.334	7	1 56 59.87	2.2167	9 45 54.2	9.199
8	0 16 49.02	2.0631	2 1 18.9	10.333	8	1 59 13.00	2.2209	9 55 4.8	9.153
9	0 18 52.87	2.0653	2 11 32.8	10.331	9	2 1 26.38	2.2252	10 4 12.6	9.107
10	0 20 56.85	2.0675	2 21 46.6	10.329	10	2 3 40.02	2.2296	10 13 17.6	9.060
11	0 23 0.97	2.0698	2 32 0.3	10.327	11	2 5 53.93	2.2340	10 22 19.8	9.012
12	0 25 5.23	2.0722	2 42 13.8	10.323	12	2 8 8.10	2.2384	10 31 19.1	8.963
13	0 27 9.63	2.0746	2 52 27.0	10.317	13	2 10 22.54	2.2429	10 40 15.4	8.919
14	0 29 14.18	2.0770	3 2 39.8	10.310	14	2 12 37.25	2.2473	10 49 8.6	8.861
15	0 31 18.87	2.0794	3 12 52.2	10.303	15	2 14 52.22	2.2518	10 57 58.7	8.808
16	0 33 23.71	2.0820	3 23 4.2	10.196	16	2 17 7.47	2.2564	11 6 45.6	8.755
17	0 35 28.71	2.0846	3 33 15.7	10.187	17	2 19 22.90	2.2610	11 15 29.3	8.701
18	0 37 33.86	2.0872	3 43 26.7	10.178	18	2 21 38.79	2.2657	11 24 9.7	8.645
19	0 39 39.17	2.0899	3 53 37.1	10.168	19	2 23 54.87	2.2703	11 32 46.7	8.588
20	0 41 44.64	2.0926	4 3 46.9	10.157	20	2 26 11.22	2.2748	11 41 20.3	8.530
21	0 43 50.28	2.0953	4 13 56.0	10.145	21	2 28 27.85	2.2795	11 49 50.3	8.470
22	0 45 56.08	2.0980	4 24 4.3	10.133	22	2 30 44.76	2.2842	11 58 16.7	8.410
23	0 48 2.06	2.1011	N. 4 34 11.9	10.120	23	2 33 1.96	2.2890	N. 12 6 39.5	8.350
THURSDAY 22.					SATURDAY 24.				
0	0 50 8.21	2.1039	N. 4 44 18.7	10.106	0	2 35 19.44	2.2937	N. 12 14 58.7	8.288
1	0 52 14.53	2.1068	4 54 24.6	10.090	1	2 37 37.21	2.2985	12 23 14.1	8.234
2	0 54 21.03	2.1099	5 4 29.5	10.074	2	2 39 55.26	2.3033	12 31 25.6	8.189
3	0 56 27.72	2.1130	5 14 33.4	10.057	3	2 42 13.60	2.3081	12 39 33.2	8.094
4	0 58 34.59	2.1161	5 24 36.3	10.039	4	2 44 32.23	2.3129	12 47 36.9	8.027
5	1 0 41.65	2.1192	5 34 38.1	10.020	5	2 46 51.15	2.3177	12 55 36.5	7.959
6	1 2 48.90	2.1224	5 44 38.7	10.000	6	2 49 10.35	2.3225	13 3 32.0	7.890
7	1 4 56.34	2.1257	5 54 38.1	9.979	7	2 51 29.85	2.3274	13 11 23.3	7.820
8	1 7 3.98	2.1290	6 4 36.2	9.958	8	2 53 49.64	2.3323	13 19 10.4	7.749
9	1 9 11.82	2.1323	6 14 33.1	9.937	9	2 56 9.73	2.3372	13 26 53.2	7.677
10	1 11 19.86	2.1357	6 24 28.6	9.913	10	2 58 30.11	2.3421	13 34 31.6	7.603
11	1 13 28.10	2.1391	6 34 22.6	9.888	11	3 0 50.78	2.3469	13 42 5.5	7.528
12	1 15 36.55	2.1426	6 44 15.1	9.863	12	3 3 11.74	2.3518	13 49 35.0	7.453
13	1 17 45.21	2.1461	6 54 6.1	9.837	13	3 5 33.00	2.3567	13 56 59.9	7.376
14	1 19 54.08	2.1497	7 3 55.5	9.809	14	3 7 54.55	2.3617	14 4 20.1	7.297
15	1 22 3.17	2.1532	7 13 43.2	9.781	15	3 10 16.40	2.3666	14 11 35.6	7.218
16	1 24 12.47	2.1568	7 23 29.2	9.752	16	3 12 38.54	2.3715	14 18 46.3	7.138
17	1 26 21.99	2.1606	7 33 13.5	9.722	17	3 15 0.98	2.3764	14 25 52.2	7.057
18	1 28 31.74	2.1643	7 42 55.9	9.691	18	3 17 23.71	2.3813	14 32 53.1	6.974
19	1 30 41.71	2.1681	7 52 36.4	9.659	19	3 19 46.74	2.3862	14 39 49.1	6.891
20	1 32 51.91	2.1719	8 2 15.0	9.627	20	3 22 10.06	2.3911	14 46 40.0	6.806
21	1 35 2.34	2.1757	8 11 51.6	9.593	21	3 24 33.67	2.3960	14 53 25.8	6.720
22	1 37 13.00	2.1797	8 21 26.1	9.558	22	3 26 57.58	2.4009	15 0 6.4	6.633
23	1 39 23.90	2.1837	8 30 58.5	9.523	23	3 29 21.78	2.4058	15 6 41.8	6.545
24	1 41 35.04	2.1877	N. 8 40 28.8	9.486	24	3 31 46.27	2.4107	N. 15 13 11.8	6.455

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 25.					TUESDAY 27.				
0	3 31 46.27	2.4107	N.15° 13' 11.8"	6.455	0	5 32 24.47	2.5939	N.18° 20' 52.8"	1.830
1	3 34 11.06	2.4155	15 19 36.4	6.365	1	5 35 0.17	2.5960	18 21 50.7	0.899
2	3 36 36.13	2.4203	15 25 55.6	6.274	2	5 37 35.99	2.5979	18 22 40.7	0.768
3	3 39 1.49	2.4251	15 32 9.3	6.189	3	5 40 11.92	2.5998	18 23 22.9	0.637
4	3 41 27.14	2.4298	15 38 17.4	6.098	4	5 42 47.96	2.6016	18 23 57.2	0.505
5	3 43 53.07	2.4346	15 44 19.9	5.993	5	5 45 24.11	2.6033	18 24 23.5	0.373
6	3 46 19.29	2.4393	15 50 16.6	5.897	6	5 48 0.36	2.6049	18 24 41.9	0.241
7	3 48 45.79	2.4441	15 56 7.5	5.800	7	5 50 36.70	2.6064	18 24 52.4	+ 0.108
8	3 51 12.58	2.4488	16 1 52.6	5.708	8	5 53 13.13	2.6078	18 24 54.9	- 0.096
9	3 53 39.65	2.4535	16 7 31.8	5.603	9	5 55 49.64	2.6091	18 24 49.3	0.159
10	3 56 7.00	2.4582	16 13 5.0	5.503	10	5 58 26.22	2.6109	18 24 35.8	0.292
11	3 58 34.63	2.4628	16 18 32.2	5.409	11	6 1 2.86	2.6119	18 24 14.3	0.426
12	4 1 2.53	2.4673	16 23 53.2	5.309	12	6 3 39.56	2.6129	18 23 44.7	0.560
13	4 3 30.71	2.4719	16 29 8.1	5.196	13	6 6 16.32	2.6131	18 23 7.1	0.693
14	4 5 59.16	2.4763	16 34 16.8	5.090	14	6 8 53.13	2.6139	18 22 21.5	0.827
15	4 8 27.87	2.4807	16 39 19.1	4.986	15	6 11 29.99	2.6146	18 21 27.9	0.961
16	4 10 56.85	2.4851	16 44 15.1	4.880	16	6 14 6.88	2.6151	18 20 26.2	1.095
17	4 13 26.09	2.4895	16 49 4.7	4.773	17	6 16 43.80	2.6156	18 19 16.5	1.228
18	4 15 55.59	2.4938	16 53 47.9	4.665	18	6 19 20.75	2.6159	18 17 58.8	1.362
19	4 18 25.35	2.4981	16 58 24.5	4.555	19	6 21 57.71	2.6161	18 16 33.1	1.495
20	4 20 55.37	2.5024	17 2 54.5	4.445	20	6 24 34.68	2.6169	18 14 59.4	1.629
21	4 23 25.64	2.5068	17 7 17.9	4.334	21	6 27 11.66	2.6163	18 13 17.6	1.763
22	4 25 56.16	2.5107	17 11 34.6	4.229	22	6 29 48.64	2.6169	18 11 27.8	1.896
23	4 28 26.93	2.5148	N.17° 15' 44.5"	4.108	23	6 32 25.61	2.6160	N.18° 9' 30.1"	2.029
MONDAY 26.					WEDNESDAY 28.				
0	4 30 57.94	2.5188	N.17° 19' 47.6"	3.994	0	6 35 2.56	2.6157	N.18° 7' 24.4"	2.169
1	4 33 29.19	2.5228	17 23 43.8	3.879	1	6 37 39.49	2.6152	18 5 10.7	2.304
2	4 36 0.67	2.5267	17 27 33.1	3.764	2	6 40 16.39	2.6148	18 2 49.1	2.438
3	4 38 32.39	2.5305	17 31 15.5	3.648	3	6 42 53.27	2.6143	18 0 19.6	2.557
4	4 41 4.33	2.5343	17 34 50.9	3.530	4	6 45 30.11	2.6136	17 57 42.2	2.689
5	4 43 36.50	2.5380	17 38 19.1	3.411	5	6 48 6.90	2.6127	17 54 56.9	2.801
6	4 46 8.89	2.5417	17 41 40.2	3.293	6	6 50 43.63	2.6118	17 52 3.7	2.952
7	4 48 41.50	2.5452	17 44 54.1	3.179	7	6 53 20.31	2.6108	17 49 2.7	3.082
8	4 51 14.32	2.5487	17 48 0.8	3.059	8	6 55 56.93	2.6096	17 45 53.9	3.212
9	4 53 47.34	2.5521	17 51 0.3	2.931	9	6 58 33.47	2.6084	17 42 37.3	3.341
10	4 56 20.57	2.5554	17 53 52.5	2.806	10	7 1 9.94	2.6072	17 39 13.0	3.469
11	4 58 53.99	2.5587	17 56 37.3	2.685	11	7 3 46.33	2.6058	17 35 41.0	3.598
12	5 1 27.61	2.5619	17 59 14.7	2.562	12	7 6 22.63	2.6043	17 32 1.2	3.726
13	5 4 1.42	2.5650	18 1 44.7	2.437	13	7 8 58.84	2.6027	17 28 13.8	3.853
14	5 6 35.41	2.5681	18 4 7.2	2.312	14	7 11 34.95	2.6009	17 24 18.8	3.980
15	5 9 9.59	2.5712	18 6 22.2	2.187	15	7 14 10.95	2.5991	17 20 16.2	4.106
16	5 11 43.95	2.5740	18 8 29.6	2.060	16	7 16 46.84	2.5972	17 16 6.1	4.231
17	5 14 18.47	2.5768	18 10 29.4	1.933	17	7 19 22.61	2.5959	17 11 48.5	4.355
18	5 16 53.16	2.5795	18 12 21.6	1.806	18	7 21 58.26	2.5939	17 7 23.5	4.479
19	5 19 28.01	2.5821	18 14 6.1	1.677	19	7 24 33.79	2.5910	17 2 51.1	4.602
20	5 22 3.01	2.5847	18 15 42.9	1.550	20	7 27 9.18	2.5887	16 58 11.3	4.724
21	5 24 38.17	2.5871	18 17 12.1	1.422	21	7 29 44.43	2.5863	16 53 24.2	4.846
22	5 27 13.47	2.5894	18 18 33.5	1.299	22	7 32 19.53	2.5838	16 48 29.8	4.967
23	5 29 48.90	2.5917	18 19 47.1	1.161	23	7 34 54.49	2.5814	16 43 28.2	5.088
24	5 32 24.47	2.5939	N.18° 20' 52.8"	1.030	24	7 37 29.30	2.5788	N.16° 38' 19.5"	5.204

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 29.					SATURDAY 31.				
0	7 37 29.30	2.5788	N.16 38' 19.5"	5.904	0	9 37 3.86	2.3875	N.10 32' 46.4"	9.536
1	7 40 3.95	2.5761	16 33 3.7	5.398	1	9 39 26.97	2.3898	10 23 12.5	9.583
2	7 42 38.43	2.5733	16 27 40.8	5.440	2	9 41 49.80	2.3798	10 13 35.2	9.649
3	7 45 12.74	2.5704	16 22 10.9	5.556	3	9 44 12.35	2.3798	10 3 54.6	9.703
4	7 47 46.88	2.5675	16 16 34.1	5.671	4	9 46 34.63	2.3690	9 54 10.8	9.766
5	7 50 20.84	2.5646	16 10 50.4	5.785	5	9 48 56.63	2.3643	9 44 23.9	9.807
6	7 52 54.63	2.5616	16 4 59.9	5.898	6	9 51 18.35	2.3597	9 34 34.0	9.857
7	7 55 28.23	2.5584	15 59 2.7	6.010	7	9 53 39.79	2.3550	9 24 41.1	9.907
8	7 58 1.63	2.5551	15 52 58.7	6.129	8	9 56 0.95	2.3504	9 14 45.2	9.955
9	8 0 34.84	2.5518	15 46 48.1	6.231	9	9 58 21.84	2.3458	9 4 46.5	10.001
10	8 3 7.85	2.5484	15 40 31.0	6.330	10	10 0 42.45	2.3419	8 54 45.1	10.045
11	8 5 40.65	2.5450	15 34 7.4	6.447	11	10 3 2.78	2.3365	8 44 41.1	10.088
12	8 8 13.25	2.5416	15 27 37.3	6.554	12	10 5 22.83	2.3319	8 34 34.5	10.130
13	8 10 45.64	2.5380	15 21 0.9	6.659	13	10 7 42.61	2.3274	8 24 25.5	10.170
14	8 13 17.81	2.5343	15 14 18.2	6.764	14	10 10 2.12	2.3228	8 14 14.1	10.210
15	8 15 49.76	2.5307	15 7 29.2	6.867	15	10 12 21.35	2.3183	8 4 0.3	10.248
16	8 18 21.49	2.5269	15 0 34.1	6.969	16	10 14 40.31	2.3138	7 53 44.3	10.284
17	8 20 52.99	2.5231	14 53 32.9	7.069	17	10 16 59.01	2.3093	7 43 26.2	10.319
18	8 23 24.26	2.5192	14 46 25.8	7.168	18	10 19 17.43	2.3048	7 33 6.0	10.353
19	8 25 55.30	2.5153	14 39 12.7	7.267	19	10 21 35.58	2.3003	7 22 43.8	10.386
20	8 28 26.10	2.5114	14 31 53.7	7.364	20	10 23 53.47	2.2959	7 12 19.7	10.417
21	8 30 56.67	2.5075	14 24 29.0	7.459	21	10 26 11.09	2.2915	7 1 53.8	10.447
22	8 33 27.00	2.5034	14 16 58.6	7.554	22	10 28 28.45	2.2871	6 51 26.1	10.475
23	8 35 57.08	2.4992	N.14 9 22.5	7.648	23	10 30 45.55	2.2827	N. 6 40 56.8	10.508
FRIDAY 30.					SUNDAY, FEBRUARY 1.				
0	8 38 26.91	2.4951	N.14 1 40.8	7.740	0	10 33 2.38	2.2783	N. 6 30 25.9	10.538
1	8 40 56.49	2.4909	13 53 53.7	7.830	PHASES OF THE MOON.				
2	8 43 25.82	2.4867	13 46 1.2	7.920					
3	8 45 54.90	2.4825	13 38 3.3	8.008	<div>☾ Last Quarter . . Jan. 7 15 36.6</div> <div>● New Moon . . . . 15 20 36.5</div> <div>☾ First Quarter . . . . 23 13 26.3</div> <div>○ Full Moon . . . . 30 4 19.2</div>				
4	8 48 23.72	2.4783	13 30 0.2	8.094					
5	8 50 52.28	2.4739	13 21 52.0	8.179	<div>☾ Apogee . . . . Jan. 12 20.8</div> <div>☾ Perigee . . . . . 28 13.8</div>				
6	8 53 20.59	2.4696	13 13 38.7	8.263					
7	8 55 48.63	2.4652	13 5 20.4	8.346					
8	8 58 16.41	2.4607	12 56 57.2	8.427					
9	9 0 43.92	2.4562	12 48 29.2	8.507					
10	9 3 11.16	2.4517	12 39 56.4	8.585					
11	9 5 38.13	2.4473	12 31 19.0	8.669					
12	9 8 4.84	2.4428	12 22 37.0	8.737					
13	9 10 31.27	2.4382	12 13 50.5	8.812					
14	9 12 57.43	2.4337	12 4 59.6	8.885					
15	9 15 23.32	2.4292	11 56 4.3	8.957					
16	9 17 48.93	2.4246	11 47 4.8	9.026					
17	9 20 14.27	2.4200	11 38 1.2	9.094					
18	9 22 39.33	2.4153	11 28 53.5	9.162					
19	9 25 4.11	2.4107	11 19 41.8	9.228					
20	9 27 28.62	2.4061	11 10 26.2	9.292					
21	9 29 52.85	2.4015	11 1 6.8	9.355					
22	9 32 16.80	2.3968	10 51 43.6	9.417					
23	9 34 40.47	2.3922	10 42 16.8	9.477					
24	9 37 3.86	2.3875	N.10 32 46.4	9.536					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Arietis W.	70° 29' 2"	9090	72° 20' 17"	9094	74° 11' 26"	9098	76° 2' 28"	9104
	Regulus E.	43 18 29	9090	41 24 54	9097	39 31 31	9015	37 38 21	9095
	JUPITER E.	50 43 28	1986	48 49 31	1993	46 55 45	9001	45 2 12	9019
	Spica E.	96 48 31	1986	94 54 35	1992	93 0 48	1999	91 7 12	9006
2	$\alpha$ Arietis W.	85 14 53	9148	87 4 39	9159	88 54 8	9179	90 43 18	9184
	JUPITER E.	35 38 18	9067	33 46 28	9069	31 55 1	9098	30 3 59	9115
	Spica E.	81 42 29	9055	79 50 20	9067	77 58 30	9079	76 6 59	9092
3	Pollux W.	25 53 12	9641	27 31 12	9601	29 10 5	9579	30 49 38	9561
	Spica E.	66 54 44	9167	65 5 27	9183	63 16 34	9200	61 28 7	9217
	Antares E.	112 25 35	9219	110 37 36	9234	108 49 59	9249	107 2 45	9265
	VENUS E.	118 36 26	9552	116 56 25	9570	115 16 49	9588	113 37 38	9607
4	Pollux W.	39 12 11	9590	40 52 56	9593	42 33 37	9599	44 14 10	9637
	Spica E.	52 32 26	9300	50 46 40	9328	49 1 22	9348	47 16 33	9368
	Antares E.	98 12 37	9352	96 27 53	9370	94 43 35	9388	92 59 43	9407
	VENUS E.	105 28 10	9703	103 51 36	9725	102 15 29	9746	100 39 50	9767
	SUN E.	134 38 5	9656	133 0 26	9675	131 23 12	9694	129 46 24	9713
5	Pollux W.	52 33 44	9591	54 12 51	9605	55 51 39	9619	57 30 8	9634
	Spica E.	38 39 37	9470	36 57 41	9491	35 16 15	9512	33 35 18	9533
	Antares E.	84 27 14	9504	82 46 7	9524	81 5 27	9544	79 25 15	9564
	VENUS E.	92 48 32	9673	91 15 39	9694	89 43 13	9716	88 11 15	9738
	SUN E.	121 48 51	9612	120 14 39	9633	118 40 54	9653	117 7 35	9673
6	Pollux W.	65 37 28	9710	67 13 54	9726	68 49 50	9743	70 25 42	9759
	Regulus W.	28 44 55	9641	30 22 54	9657	32 0 32	9679	33 37 49	9697
	JUPITER W.	21 38 28	9656	23 16 7	9665	24 53 34	9676	26 30 46	9686
	Antares E.	71 11 6	9663	69 33 37	9683	67 56 34	9703	66 19 58	9722
	VENUS E.	80 38 7	3043	79 8 47	3063	77 39 52	3084	76 11 23	3105
	SUN E.	109 27 25	9973	107 56 39	9993	106 26 17	3013	104 56 20	3032
7	Pollux W.	78 19 5	9636	79 52 44	9652	81 26 4	9667	82 59 5	9683
	Regulus W.	41 39 6	9765	43 14 20	9779	44 49 15	9795	46 23 50	9809
	JUPITER W.	34 32 29	9755	36 7 56	9769	37 43 4	9783	39 17 54	9797
	Antares E.	58 23 23	9818	56 49 19	9838	55 15 40	9856	53 42 25	9876
	VENUS E.	68 54 58	3200	67 26 49	3219	66 3 2	3237	64 37 37	3255
	SUN E.	97 32 25	3194	96 4 45	3142	94 37 26	3158	93 10 27	3176
8	Regulus W.	54 12 8	9678	55 44 55	9691	57 17 26	9703	58 49 41	9715
	JUPITER W.	47 7 41	9699	48 40 48	9714	50 13 40	9726	51 46 17	9738
	Antares E.	46 2 13	9699	44 31 22	9699	43 0 56	3009	41 30 54	3026
	VENUS E.	57 35 32	3336	56 12 4	3352	54 48 53	3368	53 26 0	3389
	SUN E.	86 0 27	3254	84 35 22	3269	83 10 34	3289	81 46 2	3296
9	Regulus W.	66 27 17	9699	67 58 8	9719	69 28 47	9739	70 59 14	9757
	JUPITER W.	59 25 49	9660	60 57 4	9680	62 28 8	9698	63 59 1	9717
	Antares E.	34 7 3	3137	32 39 38	3169	31 12 44	3190	29 46 23	3200
	VENUS E.	46 35 31	3446	45 14 9	3461	43 53 1	3479	42 32 6	3484
	SUN E.	74 47 11	3356	73 24 6	3369	72 1 14	3379	70 38 34	3390
10	Regulus W.	78 28 58	3034	79 58 28	3041	81 27 50	3047	82 57 4	3053



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Dist.	XV <sup>h</sup> .	P. L. of Dist.	XVIII <sup>h</sup> .	P. L. of Dist.	XXI <sup>h</sup> .	P. L. of Dist.
1	$\alpha$ Arietis W.	77° 53' 21"	9111	79° 44' 4"	9119	81° 34' 34"	9198	83° 24' 51"	9198
	Regulus E.	35 45 26	9036	33 52 48	9048	32 0 28	9061	30 8 29	9075
	JUPITER E.	43 8 52	9019	41 15 47	9030	39 22 59	9041	37 30 29	9053
	Spica E.	89 13 47	9014	87 20 35	9023	85 27 37	9033	83 34 55	9044
2	$\alpha$ Arietis W.	92 32 9	9198	94 20 39	9213	96 8 47	9229	97 56 31	9245
	JUPITER E.	28 13 23	9134	26 23 16	9155	24 33 40	9177	22 44 38	9203
	Spica E.	74 15 48	9106	72 24 58	9190	70 34 30	9135	68 44 25	9151
3	Pollux W.	32 29 41	9536	34 10 4	9527	35 50 40	9591	37 31 24	9519
	Spica E.	59 40 5	9535	57 52 29	9553	56 5 20	9579	54 18 39	9591
	Antares E.	105 15 54	9561	103 29 27	9598	101 43 25	9615	99 57 48	9633
	VENUS E.	111 58 52	9596	110 20 32	9645	108 42 38	9695	107 5 11	9684
4	Pollux W.	45 54 32	9545	47 34 42	9555	49 14 39	9566	50 54 20	9579
	Spica E.	45 32 12	9588	43 48 20	9408	42 4 56	9429	40 22 2	9449
	Antares E.	91 16 18	9496	89 33 21	9445	87 50 51	9465	86 8 49	9484
	VENUS E.	99 4 39	9788	97 29 56	9809	95 55 40	9831	94 21 52	9859
	SUN E.	128 10 1	9739	126 34 4	9752	124 58 33	9779	123 23 29	9799
5	Pollux W.	59 8 17	9649	60 46 6	9664	62 23 34	9680	64 0 41	9695
	Spica E.	31 54 51	9554	30 14 53	9577	28 35 26	9599	26 56 29	9621
	Antares E.	77 45 31	9584	76 6 14	9604	74 27 24	9624	72 49 2	9643
	VENUS E.	86 39 44	9659	85 8 40	9681	83 38 3	9698	82 7 52	9699
	SUN E.	115 34 42	9694	114 2 15	9713	112 30 13	9733	110 58 36	9754
6	Pollux W.	72 1 4	9775	73 36 5	9790	75 10 46	9806	76 45 6	9822
	Regulus W.	35 14 46	9763	36 51 22	9719	38 27 37	9734	40 3 32	9750
	JUPITER W.	28 7 42	9701	29 44 21	9714	31 20 42	9726	32 56 45	9749
	Antares E.	64 43 48	9741	63 8 3	9761	61 32 44	9781	59 57 51	9800
	VENUS E.	74 43 19	3194	73 15 39	3143	71 48 22	3163	70 21 29	3182
	SUN E.	103 26 47	3051	101 57 37	3070	100 28 51	3088	99 0 27	3106
7	Pollux W.	84 31 46	9898	86 4 8	9919	87 36 12	9936	89 7 58	9940
	Regulus W.	47 58 6	9893	49 32 4	9898	51 5 43	9959	52 39 4	9985
	JUPITER W.	40 52 26	9810	42 26 41	9894	44 0 38	9937	45 34 18	9950
	Antares E.	52 9 35	9894	50 37 9	9913	49 5 7	9931	47 33 28	9950
	VENUS E.	63 12 33	3271	61 47 48	3288	60 23 23	3306	58 59 18	3329
	SUN E.	91 43 48	3199	90 17 29	3209	88 51 30	3294	87 25 49	3240
8	Regulus W.	60 21 40	9937	61 53 25	9938	63 24 56	9949	64 56 13	9959
	JUPITER W.	53 18 39	9909	54 50 47	9930	56 22 41	9931	57 54 21	9940
	Antares E.	40 1 16	3048	38 32 3	3089	37 3 16	3091	35 34 56	3114
	VENUS E.	52 3 23	3396	50 41 2	3410	49 18 57	3423	47 57 7	3436
	SUN E.	80 21 46	3310	78 57 46	3392	77 34 0	3335	76 10 29	3346
9	Regulus W.	72 29 31	3005	73 59 37	3013	75 29 33	3021	76 59 20	3028
	JUPITER W.	65 29 43	2985	67 0 15	2993	68 30 37	3000	70 0 50	3006
	Antares E.	28 20 37	3252	26 55 29	3288	25 31 3	3298	24 7 24	3275
	VENUS E.	41 11 24	3195	39 50 54	3506	38 30 36	3516	37 10 30	3526
	SUN E.	69 16 6	3400	67 53 49	3408	66 31 42	3417	65 9 45	3425
10	Regulus W.	84 26 11	3058	85 55 12	3063	87 24 7	3067	88 52 57	3073

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Dist.	III.	P. L. of Dist.	VI.	P. L. of Dist.	IX.	P. L. of Dist.
10	JUPITER W.	71° 30' 55"	3013	73° 0' 51"	3019	74° 30' 40"	3026	76° 0' 21"	3031
	Spica W.	25 1 12	3063	26 30 7	3065	27 58 59	3069	29 27 47	3071
	VENUS E.	35 50 35	3536	34 30 51	3545	33 11 17	3545	31 51 54	3565
	SUN E.	63 47 57	3423	62 26 18	3441	61 4 48	3448	59 43 26	3455
11	Regulus W.	90 21 41	3076	91 50 20	3078	93 18 56	3081	94 47 29	3083
	JUPITER W.	83 27 20	3061	84 56 30	3065	86 25 35	3068	87 54 36	3069
	Spica W.	36 50 56	3084	38 19 25	3087	39 47 51	3089	41 16 14	3091
	SUN E.	52 58 20	3483	51 37 37	3488	50 16 59	3491	48 56 25	3496
12	Regulus W.	102 9 33	3089	103 37 52	3093	105 6 10	3093	106 34 28	3093
	JUPITER W.	95 19 8	3067	96 47 58	3069	98 16 47	3068	99 45 36	3068
	Spica W.	48 37 46	3085	50 6 2	3085	51 34 18	3085	53 2 34	3094
	SUN E.	42 14 35	3511	40 54 23	3514	39 34 14	3516	38 14 7	3518
13	Regulus W.	113 56 3	3090	115 24 25	3099	116 52 48	3097	118 21 14	3095
	Spica W.	60 24 9	3089	61 52 32	3087	63 20 58	3084	64 49 27	3089
	SUN E.	31 34 11	3530	30 14 20	3533	28 54 32	3536	27 34 48	3541
17	SUN W.	13 21 37	3589	14 40 23	3536	16 0 7	3494	17 20 38	3480
	α Arietis E.	85 5 42	3043	83 36 23	3038	82 6 57	3031	80 37 23	3036
	Aldebaran E.	118 6 51	3042	116 35 25	3035	115 3 50	3029	113 32 7	3021
18	SUN W.	24 11 11	3346	25 34 29	3330	26 58 6	3315	28 22 0	3301
	α Arietis E.	73 7 51	3099	71 37 37	3093	70 7 16	3099	68 36 49	3094
	Aldebaran E.	105 51 22	3087	104 18 46	3080	102 46 1	3072	101 13, 6	3065
19	SUN W.	35 25 27	3027	36 50 52	3025	38 16 31	3014	39 42 24	3008
	α Arietis E.	61 3 6	3061	59 32 5	3058	58 1 0	3054	56 29 50	3053
	Aldebaran E.	93 26 7	3096	91 52 13	3018	90 18 8	3009	88 43 52	3000
20	SUN W.	46 55 13	3145	48 22 28	3134	49 49 56	3123	51 17 38	3110
	α Arietis E.	48 53 17	3044	47 21 54	3045	45 50 32	3046	44 19 12	3043
	Aldebaran E.	80 49 40	3756	79 14 15	3747	77 38 37	3737	76 2 46	3728
	SATURN F.	90 26 55	3747	88 51 17	3737	87 15 26	3728	85 39 23	3718
21	SUN W.	58 39 45	3059	60 8 54	3039	61 38 18	3027	63 7 57	3014
	Fomalhaut W.	34 59 52	4129	36 9 32	4003	37 21 9	3085	38 34 34	3797
	α Arietis E.	36 44 1	3068	35 13 33	3004	33 43 25	3023	32 13 41	3047
	Aldebaran E.	68 0 16	3077	66 23 5	3066	64 45 39	3055	63 7 59	3044
	SATURN E.	77 35 53	3069	75 58 31	3058	74 20 55	3047	72 43 4	3036
22	SUN W.	70 40 12	3050	72 11 28	3037	73 43 0	3023	75 14 49	3009
	Fomalhaut W.	45 4 20	3496	46 26 7	3369	47 48 59	3316	49 12 52	3267
	α Pegasi E.	29 3 33	3061	30 21 2	3547	31 40 34	3447	33 1 57	3359
	Aldebaran E.	54 55 51	3587	53 16 38	3575	51 37 9	3563	49 57 23	3551
	SATURN E.	64 30 7	3580	62 50 45	3569	61 11 8	3558	59 31 15	3545
	Pollux E.	98 16 29	3077	96 39 19	3064	95 1 51	3052	93 24 6	3039
23	SUN W.	82 58 20	3040	84 31 56	3036	86 5 50	3011	87 40 3	3797
	Fomalhaut W.	56 25 38	3063	57 54 33	3029	59 24 10	3097	60 54 27	3095
	α Pegasi W.	40 11 12	3035	41 40 41	3086	43 11 11	3043	44 42 37	3091
	Aldebaran E.	41 34 15	3488	39 52 45	3475	38 10 57	3462	36 28 50	3449

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	JUPITER	W.	77° 29' 56"	3035	78° 59' 25"	3040	80° 28' 48"	3044	81° 58' 6"	3047
	Spica	W.	30 56 32	3074	32 25 13	3077	33 53 51	3080	35 22 25	3083
	VENUS	E.	30 32 41	3575	29 13 39	3584	27 54 47	3593	26 36 5	3603
	SUN	E.	58 22 12	3463	57 1 5	3467	55 40 4	3472	54 19 9	3478
11	Regulus	W.	96 15 59	3088	97 44 26	3088	99 12 50	3090	100 41 12	3091
	JUPITER	W.	89 23 34	3083	90 52 30	3084	92 21 24	3085	93 50 17	3086
	Spica	W.	42 44 35	3093	44 12 55	3093	45 41 13	3094	47 9 30	3095
	SUN	E.	47 35 56	3499	46 15 31	3502	44 55 9	3505	43 34 50	3508
12	Regulus	W.	108 2 46	3092	109 31 5	3092	110 59 24	3093	112 27 43	3091
	JUPITER	W.	101 14 25	3067	102 43 15	3067	104 12 5	3068	105 40 56	3064
	Spica	W.	54 30 51	3093	55 59 9	3092	57 27 28	3091	58 55 48	3091
	SUN	E.	36 54 3	3590	35 34 1	3523	34 14 2	3525	32 54 5	3527
13	Regulus	W.	119 49 42	3083	121 18 12	3081	122 46 45	3078	124 15 21	3076
	Spica	W.	66 17 59	3079	67 46 34	3077	69 15 12	3074	70 43 54	3071
	SUN	E.	26 15 9	3545	24 55 35	3551	23 36 7	3558	22 16 47	3567
17	SUN	W.	18 41 47	3431	20 3 29	3406	21 25 39	3384	22 48 14	3365
	α Arietis	E.	79 7 42	3090	77 37 54	3015	76 8 0	3000	74 37 59	3004
	Aldebaran	E.	112 0 15	2915	110 28 15	2908	108 56 6	2901	107 23 49	2894
18	SUN	W.	29 46 11	3988	31 10 37	3974	32 35 19	3961	34 0 16	3949
	α Arietis	E.	67 6 16	2979	65 35 37	2974	64 4 52	2970	62 34 2	2965
	Aldebaran	E.	99 40 2	2957	98 6 48	2950	96 33 25	2942	94 59 51	2934
19	SUN	W.	41 8 31	3191	42 34 51	3179	44 1 25	3168	45 28 12	3157
	α Arietis	E.	54 58 37	2950	53 27 21	2947	51 56 2	2945	50 24 40	2944
	Aldebaran	E.	87 9 24	2792	85 34 45	2783	83 59 55	2774	82 24 53	2766
20	SUN	W.	52 45 35	3099	54 13 46	3087	55 42 11	3075	57 10 51	3064
	α Arietis	E.	42 47 55	2963	41 16 43	2959	39 45 39	2956	38 14 44	2976
	Aldebaran	E.	74 26 43	2718	72 50 27	2707	71 13 57	2697	69 37 13	2687
	SATURN	E.	84 3 7	2708	82 26 38	2698	80 49 56	2689	79 13 1	2679
21	SUN	W.	64 37 52	3001	66 8 3	2989	67 38 30	2978	69 9 13	2963
	Fomalhaut	W.	39 49 39	3709	41 6 17	3629	42 24 20	3555	43 43 43	3483
	α Arietis	E.	30 44 26	3077	29 15 48	3114	27 47 54	3158	26 20 55	3215
	Aldebaran	E.	61 30 4	2633	59 51 54	2622	58 13 29	2610	56 34 48	2599
	SATURN	E.	71 4 58	2626	69 26 38	2615	67 48 3	2604	66 9 13	2592
22	SUN	W.	76 46 56	2996	78 19 20	2982	79 52 2	2968	81 25 2	2954
	Fomalhaut	W.	50 37 42	3220	52 3 27	3177	53 30 3	3138	54 57 27	3092
	α Pegasi	W.	34 25 0	3980	35 49 35	3909	37 15 33	3146	38 42 47	3087
	Aldebaran	E.	48 17 20	2538	46 37 0	2526	44 56 22	2513	43 15 27	2501
	SATURN	E.	57 51 5	2534	56 10 39	2522	54 29 56	2509	52 48 56	2497
	Pollux	E.	91 46 4	2626	90 7 45	2614	88 29 9	2601	86 50 16	2589
23	SUN	W.	89 14 35	2782	90 49 26	2768	92 24 36	2754	94 0 4	2740
	Fomalhaut	W.	62 25 23	2936	63 56 56	2909	65 29 4	2883	67 1 45	2858
	α Pegasi	W.	46 14 55	2982	47 48 2	2936	49 21 56	2792	50 56 34	2781
	Aldebaran	E.	34 46 25	2436	33 3 41	2423	31 20 39	2410	29 37 18	2396

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	SATURN E.	51° 7' 39"	9485	49° 26' 5"	9473	47° 44' 14"	9461	46° 2' 6"	9450
	Pollux E.	85 11 6	9577	83 31 39	9564	81 51 55	9552	80 11 54	9540
24	SUN W.	95 35 51	9725	97 11 57	9711	98 48 22	9696	100 25 7	9681
	Fomalhaut W.	68 34 58	9633	70 8 43	9609	71 42 59	9788	73 17 43	9766
	α Pegasi W.	52 31 53	9731	54 7 52	9709	55 44 29	9675	57 21 42	9650
	SATURN E.	37 27 11	9389	35 43 21	9378	33 59 15	9367	32 14 53	9357
	Pollux E.	71 47 38	9481	70 5 58	9470	68 24 2	9459	66 41 51	9448
	Regulus E.	107 53 46	9390	106 9 57	9376	104 25 48	9363	102 41 20	9350
25	SUN W.	108 33 39	9612	110 12 18	9599	111 51 15	9585	113 30 30	9572
	Fomalhaut W.	81 18 0	9674	82 55 15	9657	84 32 52	9643	86 10 49	9630
	α Pegasi W.	65 35 57	9538	67 16 17	9518	68 57 5	9499	70 38 19	9489
	Pollux E.	58 7 23	9402	56 23 51	9395	54 40 9	9389	52 56 18	9383
	Regulus E.	93 54 10	9283	92 7 46	9271	90 21 4	9258	88 34 3	9245
	JUPITER E.	99 36 22	9254	97 49 15	9241	96 1 49	9229	94 14 4	9216
26	SUN W.	121 51 11	9511	123 32 9	9500	125 13 22	9489	126 54 50	9479
	Fomalhaut W.	94 24 55	9572	96 4 28	9564	97 44 12	9557	99 24 6	9551
	α Pegasi W.	79 10 22	9404	80 53 51	9391	82 37 38	9379	84 21 43	9368
	α Arietis W.	35 36 58	9483	37 18 35	9448	39 1 1	9417	40 44 12	9388
	Pollux E.	44 15 30	9372	42 31 15	9375	40 47 5	9361	39 3 3	9369
	Regulus E.	79 34 27	9187	77 45 40	9176	75 56 37	9166	74 7 19	9157
	JUPITER E.	85 10 46	9157	83 21 14	9147	81 31 26	9136	79 41 22	9126
27	α Pegasi W.	93 5 52	9392	94 51 19	9316	96 36 55	9311	98 22 39	9306
	α Arietis W.	49 29 17	9279	51 15 48	9269	53 2 43	9247	54 50 0	9233
	Regulus E.	64 57 13	9113	63 6 33	9105	61 15 42	9099	59 24 41	9092
	JUPITER E.	70 27 26	9083	68 36 0	9075	66 44 23	9068	64 52 35	9062
28	α Arietis W.	63 50 55	9184	65 39 47	9177	67 28 50	9171	69 18 1	9166
	Aldebaran W.	30 2 27	9059	31 54 29	9056	33 46 36	9053	35 38 48	9051
	SATURN W.	21 0 49	9104	22 51 42	9099	24 42 53	9083	26 34 18	9077
	Regulus E.	50 7 34	9072	48 15 51	9070	46 24 5	9068	44 32 17	9067
	JUPITER E.	55 31 31	9041	53 39 1	9039	51 46 27	9037	49 53 50	9036
	Spica E.	103 38 2	9065	101 46 9	9069	99 54 11	9059	98 2 9	9057
29	α Arietis W.	78 25 12	9158	80 14 43	9159	82 4 13	9161	83 53 39	9164
	Aldebaran W.	45 0 9	9052	46 52 22	9054	48 44 32	9057	50 36 37	9060
	SATURN W.	35 53 14	9083	37 45 10	9064	39 37 5	9065	41 28 58	9068
	Regulus E.	35 13 27	9077	33 21 53	9083	31 30 27	9089	29 39 11	9097
	JUPITER E.	40 30 52	9044	38 38 27	9049	36 46 9	9055	34 54 0	9061
	Spica E.	88 41 37	9059	86 49 34	9061	84 57 35	9064	83 5 40	9068
30	Aldebaran W.	59 55 19	9089	61 46 35	9097	63 37 39	9105	65 28 30	9114
	SATURN W.	50 47 1	9092	52 38 13	9099	54 29 14	9107	56 20 3	9116
	Spica E.	73 47 54	9086	71 56 49	9105	70 5 57	9114	68 15 19	9123
31	Aldebaran W.	74 39 3	9168	76 28 19	9180	78 17 16	9194	80 5 53	9207
	SATURN W.	65 30 29	9168	67 19 45	9180	69 8 42	9193	70 57 20	9206
	Pollux W.	32 59 30	9470	34 41 25	9456	36 23 40	9446	38 6 9	9440
	Spica E.	59 5 58	9178	57 16 58	9191	55 28 17	9205	53 39 57	9219
	Antares E.	104 42 45	9225	102 54 55	9237	101 7 23	9249	99 20 9	9262

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	SATURN E.	44° 19' 42"	9438	42° 37' 1"	9485	40° 54' 2"	9419	39° 10' 45"	9400
	POLLUX E.	78 31 36	9597	76 51 1	9516	75 10 10	9504	73 29 2	9499
24	SUN W.	102 2 12	9667	103 39 36	9654	105 17 18	9640	106 55 19	9698
	Fomalhaut W.	74 52 55	9746	76 28 34	9737	78 4 38	9708	79 41 7	9690
	α Pegasi W.	58 59 29	9696	60 37 49	9699	62 16 42	9680	63 56 5	9659
	SATURN E.	30 30 16	9347	28 45 25	9337	27 0 20	9329	25 15 3	9322
	POLLUX E.	64 59 25	9438	63 16 44	9429	61 33 50	9419	59 50 43	9410
	Regulus E.	100 56 33	9336	99 11 26	9393	97 26 0	9310	95 40 15	9296
25	SUN W.	115 10 4	9559	116 49 55	9546	118 30 4	9535	120 10 29	9599
	Fomalhaut W.	87 49 5	9615	89 27 39	9604	91 6 29	9599	92 45 35	9609
	α Pegasi W.	72 19 58	9465	74 2 1	9449	75 44 26	9433	77 27 13	9418
	POLLUX E.	51 12 19	9378	49 28 13	9374	47 44 1	9379	45 59 46	9371
	Regulus E.	86 46 43	9333	84 59 5	9392	83 11 10	9310	81 22 57	9198
	JUPITER E.	92 26 0	9304	90 37 38	9199	88 48 58	9180	87 0 1	9166
26	SUN W.	128 36 33	9470	130 18 29	9460	132 0 38	9459	133 42 59	9443
	Fomalhaut W.	101 4 9	9546	102 44 18	9543	104 24 32	9541	106 4 48	9540
	α Pegasi W.	86 6 4	9357	87 50 41	9347	89 35 32	9338	91 20 36	9330
	α Arietis W.	42 28 4	9399	44 12 33	9336	45 57 37	9316	47 43 13	9297
	POLLUX E.	37 19 12	9400	35 35 37	9415	33 52 24	9436	32 9 40	9469
	Regulus E.	72 17 46	9147	70 27 58	9137	68 37 56	9199	66 47 41	9190
	JUPITER E.	77 51 3	9116	76 0 29	9107	74 9 41	9099	72 18 40	9090
27	α Pegasi W.	100 8 30	9303	101 54 25	9301	103 40 23	9300	105 26 23	9300
	α Arietis W.	56 37 38	9291	58 25 35	9210	60 13 48	9200	62 2 15	9192
	Regulus E.	57 33 30	9087	55 42 11	9083	53 50 45	9078	51 59 12	9075
	JUPITER E.	63 0 38	9057	61 8 32	9051	59 16 18	9047	57 23 57	9044
28	α Arietis W.	71 7 19	9163	72 56 43	9160	74 46 11	9158	76 35 41	9158
	Aldebaran W.	37 31 3	9050	39 23 20	9050	41 15 37	9050	43 7 54	9051
	SATURN W.	28 25 53	9071	30 17 36	9068	32 9 25	9065	34 1 18	9063
	Regulus E.	42 40 27	9068	40 48 38	9069	38 56 51	9071	37 5 7	9073
	JUPITER E.	48 1 12	9036	46 8 34	9037	44 15 57	9039	42 23 23	9041
	Spica E.	96 10 4	9056	94 17 57	9056	92 25 50	9056	90 33 43	9057
29	α Arietis W.	85 43 1	9168	87 32 17	9179	89 21 26	9178	91 10 26	9185
	Aldebaran W.	52 28 37	9064	54 20 31	9070	56 12 17	9076	58 3 53	9083
	SATURN W.	43 20 47	9071	45 12 31	9075	47 4 9	9080	48 55 39	9085
	Regulus E.	27 48 7	9106	25 57 17	9117	24 6 44	9130	22 16 31	9146
	JUPITER E.	33 2 1	9069	31 10 14	9078	29 18 41	9088	27 27 24	9101
	Spica E.	81 13 51	9079	79 22 9	9077	77 30 35	9083	75 39 10	9079
30	Aldebaran W.	67 19 8	9134	69 9 31	9134	70 59 38	9145	72 49 29	9156
	SATURN W.	58 10 38	9125	60 0 59	9135	61 51 5	9145	63 40 55	9156
	Spica E.	66 24 55	9133	64 34 46	9143	62 44 53	9155	60 55 17	9166
31	Aldebaran W.	81 54 10	9221	83 42 6	9236	85 29 40	9251	87 16 52	9266
	SATURN W.	72 45 38	9220	74 33 36	9235	76 21 12	9250	78 8 25	9266
	POLLUX W.	39 48 47	9437	41 31 29	9437	43 14 11	9439	44 56 50	9443
	Spica E.	51 51 58	9234	50 4 21	9249	48 17 6	9265	46 30 15	9281
	Antares E.	97 33 14	9276	95 46 39	9290	94 0 25	9304	92 14 32	9290

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
<i>SUN.</i>	1	<sup>h</sup> 21 <sup>m</sup> 1 <sup>s</sup> 20.98	10.169	S. 16° 57' 30".8	+43.06	16 15.98	68.22	<sup>m</sup> 13 <sup>s</sup> 53.16	0.311
Mon.	2	21 5 24.59	10.135	16 40 8.5	43.79	16 15.82	68.11	14 0.20	0.277
Tues.	3	21 9 27.39	10.100	16 22 28.8	44.51	16 15.66	67.99	14 6.43	0.243
Wed.	4	21 13 29.39	10.066	16 4 32.0	+45.21	16 15.49	67.87	14 11.85	0.209
Thur.	5	21 17 30.59	10.033	15 46 18.7	45.89	16 15.32	67.75	14 16.47	0.176
Frid.	6	21 21 30.99	10.000	15 27 49.2	46.56	16 15.15	67.64	14 20.30	0.143
Sat.	7	21 25 30.60	9.968	15 9 3.7	+47.21	16 14.97	67.52	14 23.35	0.111
<i>SUN.</i>	8	21 29 29.44	9.936	14 50 2.8	47.84	16 14.79	67.41	14 25.63	0.079
Mon.	9	21 33 27.51	9.904	14 30 47.0	48.46	16 14.60	67.30	14 27.15	0.047
Tues.	10	21 37 24.80	9.872	14 11 16.7	+49.06	16 14.41	67.19	14 27.89	0.015
Wed.	11	21 41 21.33	9.840	13 51 32.2	49.64	16 14.22	67.08	14 27.87	0.017
Thur.	12	21 45 17.10	9.809	13 31 34.0	50.20	16 14.02	66.97	14 27.09	0.048
Frid.	13	21 49 12.13	9.778	13 11 22.6	+50.75	16 13.82	66.86	14 25.57	0.079
Sat.	14	21 53 6.43	9.747	12 50 58.3	51.27	16 13.62	66.75	14 23.32	0.110
<i>SUN.</i>	15	21 56 59.98	9.716	12 30 21.5	51.78	16 13.41	66.65	14 20.32	0.140
Mon.	16	22 0 52.80	9.686	12 9 32.8	+52.27	16 13.21	66.55	14 16.59	0.170
Tues.	17	22 4 44.91	9.656	11 48 32.6	52.74	16 13.00	66.45	14 12.16	0.200
Wed.	18	22 8 36.32	9.627	11 27 21.3	53.19	16 12.79	66.35	14 7.03	0.229
Thur.	19	22 12 27.03	9.598	11 5 59.2	+53.63	16 12.58	66.25	14 1.19	0.258
Frid.	20	22 16 17.05	9.570	10 44 26.9	54.05	16 12.37	66.15	13 54.68	0.286
Sat.	21	22 20 6.39	9.542	10 22 44.8	54.45	16 12.15	66.06	13 47.50	0.314
<i>SUN.</i>	22	22 23 55.07	9.515	10 0 53.2	+54.84	16 11.93	65.97	13 39.66	0.341
Mon.	23	22 27 43.11	9.489	9 38 52.5	55.21	16 11.71	65.88	13 31.17	0.367
Tues.	24	22 31 30.53	9.464	9 16 43.2	55.56	16 11.49	65.79	13 22.06	0.392
Wed.	25	22 35 17.35	9.439	8 54 25.7	+55.90	16 11.26	65.71	13 12.35	0.417
Thur.	26	22 39 3.58	9.415	8 32 0.3	56.22	16 11.03	65.63	13 2.06	0.441
Frid.	27	22 42 49.24	9.391	8 9 27.4	56.52	16 10.79	65.55	12 51.20	0.465
Sat.	28	22 46 34.34	9.369	7 46 47.5	56.81	16 10.55	65.47	12 39.78	0.487
<i>SUN.</i>	29	22 50 18.93	9.348	S. 7 24 0.9	+57.07	16 10.31	65.40	12 27.84	0.508

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.								
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
SUN.	1	<sup>h</sup> 21 <sup>m</sup> 1 <sup>s</sup> 18.63	10.168	S. 16° 57' 40.8"	+43.05	<sup>m</sup> 13 <sup>s</sup> 53.08	0.311	<sup>h</sup> 20 <sup>m</sup> 47 <sup>s</sup> 25.55
Mon.	2	21 5 22.23	10.134	16 40 18.8	43.78	14 0.13	0.277	20 51 22.10
Tues.	3	21 9 25.02	10.100	16 22 39.3	44.50	14 6.37	0.243	20 55 18.65
Wed.	4	21 13 27.01	10.066	16 4 42.8	+45.20	14 11.80	0.209	20 59 15.21
Thur.	5	21 17 28.20	10.033	15 46 29.7	45.88	14 16.44	0.176	21 3 11.76
Frid.	6	21 21 28.59	10.000	15 28 0.4	46.55	14 20.27	0.143	21 7 8.32
Sat.	7	21 25 28.20	9.968	15 9 15.1	+47.20	14 23.33	0.111	21 11 4.87
SUN.	8	21 29 27.04	9.936	14 50 14.4	47.83	14 25.62	0.079	21 15 1.42
Mon.	9	21 33 25.12	9.904	14 30 58.8	48.45	14 27.14	0.047	21 18 57.98
Tues.	10	21 37 22.43	9.872	14 11 28.6	+49.05	14 27.89	0.015	21 22 54.54
Wed.	11	21 41 18.96	9.840	13 51 44.2	49.63	14 27.87	0.017	21 26 51.09
Thur.	12	21 45 14.74	9.809	13 31 46.1	50.19	14 27.10	0.048	21 30 47.64
Frid.	13	21 49 9.78	9.778	13 11 34.8	+50.74	14 25.59	0.079	21 34 44.19
Sat.	14	21 53 4.09	9.747	12 51 10.6	51.27	14 23.34	0.110	21 38 40.75
SUN.	15	21 56 57.65	9.717	12 30 33.9	51.78	14 20.35	0.140	21 42 37.30
Mon.	16	22 0 50.49	9.687	12 9 45.3	+52.27	14 16.63	0.170	21 46 33.86
Tues.	17	22 4 42.62	9.657	11 48 45.2	52.74	14 12.21	0.200	21 50 30.41
Wed.	18	22 8 34.04	9.628	11 27 33.8	53.19	14 7.08	0.229	21 54 26.96
Thur.	19	22 12 24.77	9.599	11 6 11.7	+53.63	14 1.25	0.258	21 58 23.52
Frid.	20	22 16 14.81	9.571	10 44 39.4	54.05	13 54.74	0.286	22 2 20.07
Sat.	21	22 20 4.19	9.543	10 22 57.3	54.45	13 47.57	0.314	22 6 16.62
SUN.	22	22 23 52.90	9.516	10 1 5.7	+54.84	13 39.73	0.341	22 10 13.17
Mon.	23	22 27 40.57	9.490	9 39 4.9	55.21	13 31.25	0.367	22 14 9.72
Tues.	24	22 31 28.42	9.465	9 16 55.6	55.56	13 22.14	0.392	22 18 6.28
Wed.	25	22 35 15.27	9.440	8 54 38.1	+55.90	13 12.44	0.417	22 22 2.83
Thur.	26	22 39 1.53	9.416	8 32 12.6	56.22	13 2.15	0.441	22 25 59.38
Frid.	27	22 42 47.22	9.392	8 9 39.6	56.52	12 51.29	0.465	22 29 55.93
Sat.	28	22 46 32.36	9.370	7 46 59.6	56.81	12 39.87	0.487	22 33 52.49
SUN.	29	22 50 16.98	9.349	S. 7 24 12.8	+57.08	12 27.94	0.508	22 37 49.04
<p>NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.</p>								<p>Diff. for 1 Hour, + 94.8565. (Table III.)</p>

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	32	312° 51' 55.5	51' 47.6	152.09	— 0.59	9.9937355	+ 28.3	<sup>h</sup> 3 <sup>m</sup> 12 <sup>s</sup> 2.90	
2	33	313 52 45.2	52 37.1	152.05	0.47	9.9938048	29.3	3 8 6.99	
3	34	314 53 33.9	53 25.7	152.01	0.34	9.9938765	30.3	3 4 11.08	
4	35	315 54 21.6	54 13.3	151.97	— 0.20	9.9939506	+ 31.3	3 0 15.17	
5	36	316 55 8.3	54 59.8	151.92	— 0.06	9.9940269	32.2	2 56 19.27	
6	37	317 55 53.9	55 45.3	151.88	+ 0.07	9.9941051	33.0	2 52 23.36	
7	38	318 56 38.6	56 29.9	151.84	+ 0.19	9.9941851	+ 33.7	2 48 27.45	
8	39	319 57 22.3	57 13.5	151.80	0.28	9.9942669	34.4	2 44 31.54	
9	40	320 58 4.9	57 56.0	151.75	0.34	9.9943504	35.1	2 40 35.64	
10	41	321 58 46.4	58 37.4	151.71	+ 0.36	9.9944354	+ 35.7	2 36 39.73	
11	42	322 59 26.8	59 17.7	151.66	0.36	9.9945216	36.2	2 32 43.82	
12	43	323 60 5.9	59 56.7	151.61	0.33	9.9946090	36.7	2 28 47.91	
13	44	325 0 43.7	0 34.4	151.55	+ 0.27	9.9946974	+ 37.1	2 24 52.01	
14	45	326 1 20.1	1 10.7	151.49	0.19	9.9947868	37.5	2 20 56.09	
15	46	327 1 54.9	1 45.4	151.42	+ 0.09	9.9948771	37.8	2 17 0.18	
16	47	328 2 28.1	2 18.5	151.35	— 0.03	9.9949684	+ 38.2	2 13 4.27	
17	48	329 2 59.7	2 50.0	151.28	0.16	9.9950606	38.6	2 9 8.37	
18	49	330 3 29.7	3 19.8	151.21	0.29	9.9951539	39.0	2 5 12.46	
19	50	331 3 57.8	3 47.8	151.13	— 0.41	9.9952482	+ 39.5	2 1 16.55	
20	51	332 4 24.0	4 14.0	151.05	0.53	9.9953435	40.0	1 57 20.65	
21	52	333 4 48.3	4 38.2	150.97	0.63	9.9954399	40.5	1 53 24.75	
22	53	334 5 10.6	5 0.4	150.89	— 0.70	9.9955377	+ 41.0	1 49 28.84	
23	54	335 5 30.9	5 20.6	150.80	0.74	9.9956368	41.6	1 45 32.93	
24	55	336 5 49.2	5 38.8	150.72	0.75	9.9957374	42.2	1 41 37.02	
25	56	337 6 5.5	5 55.0	150.64	— 0.73	9.9958395	+ 42.9	1 37 41.12	
26	57	338 6 19.8	6 9.2	150.56	0.69	9.9959432	43.6	1 33 45.21	
27	58	339 6 32.2	6 21.5	150.48	0.62	9.9960487	44.3	1 29 49.30	
28	59	340 6 42.8	6 32.0	150.40	0.53	9.9961558	45.0	1 25 53.40	
29	60	341 6 51.4	6 40.5	150.32	— 0.41	9.9962645	+ 45.7	1 21 57.50	
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> .0.									Diff. for 1 Hour, — 9 <sup>m</sup> .8296. (Table II.)



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI- DIAMETER.

## HORIZONTAL PARALLAX.

## UPPER TRANSIT.

## AGE.

Noon.

Midnight.

Noon.

Diff. for  
1 Hour.

Midnight.

Diff. for  
1 Hour.Meridian of  
Greenwich.Diff. for  
1 Hour.

Noon.

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	
1	16' 10.3	16' 3.4	59' 14.4	- 2.03	58' 49.0	- 2.17	<sup>h</sup> 14 <sup>m</sup> 15.3	<sup>m</sup> 2.13	<sup>d</sup> 16.1
2	15 56.1	15 48.7	58 22.3	2.26	57 54.9	2.29	15 5.3	2.04	17.1
3	15 41.2	15 33.8	57 27.3	2.28	57 0.1	2.22	15 53.4	1.97	18.1
4	15 26.6	15 19.9	56 33.9	- 2.12	56 9.1	- 1.99	16 40.3	1.94	19.1
5	15 13.6	15 7.9	55 46.1	1.83	55 25.1	1.66	17 26.6	1.93	20.1
6	15 2.8	14 58.3	55 6.3	1.46	54 49.9	1.26	18 12.9	1.93	21.1
7	14 54.5	14 51.5	54 36.1	- 1.05	54 24.8	- 0.83	18 59.4	1.95	22.1
8	14 49.1	14 47.4	54 16.1	0.62	54 10.0	- 0.41	19 46.3	1.96	23.1
9	14 46.5	14 46.1	54 6.4	- 0.20	54 5.1	0.00	20 33.5	1.97	24.1
10	14 46.4	14 47.3	54 6.2	+ 0.18	54 9.4	+ 0.35	21 21.0	1.98	25.1
11	14 48.7	14 50.6	54 14.5	0.50	54 21.5	0.64	22 8.4	1.97	26.1
12	14 52.9	14 55.6	54 30.0	0.77	54 39.9	0.88	22 55.5	1.96	27.1
13	14 58.6	15 1.9	54 51.0	+ 0.97	55 3.1	+ 1.04	23 42.3	1.94	28.1
14	15 5.4	15 9.1	55 16.1	1.10	55 29.7	1.15	<sup>h</sup> 0 <sup>m</sup> 28.9		29.1
15	15 13.0	15 16.9	55 43.7	1.18	55 58.1	1.21	0 28.9	1.93	0.4
16	15 20.8	15 24.9	56 12.7	+ 1.22	56 27.4	+ 1.22	1 15.4	1.94	1.4
17	15 28.9	15 32.9	56 42.1	1.22	56 56.8	1.22	2 2.3	1.97	2.4
18	15 36.9	15 40.8	57 11.5	1.22	57 26.1	1.21	2 50.0	2.01	3.4
19	15 44.8	15 48.6	57 40.5	+ 1.19	57 54.8	+ 1.18	3 39.1	2.08	4.4
20	15 52.5	15 56.2	58 8.9	1.16	58 22.7	1.14	4 30.1	2.18	5.4
21	15 59.9	16 3.5	58 36.3	1.11	58 49.4	1.07	5 23.5	2.28	6.4
22	16 6.9	16 10.0	59 1.8	+ 1.00	59 13.4	+ 0.92	6 19.3	2.37	7.4
23	16 13.0	16 15.5	59 24.1	0.83	59 33.5	0.72	7 17.0	2.44	8.4
24	16 17.6	16 19.3	59 41.3	0.56	59 47.2	+ 0.40	8 15.8	2.45	9.4
25	16 20.3	16 20.6	59 50.9	+ 0.21	59 52.1	0.00	9 14.5	2.43	10.4
26	16 20.2	16 19.1	59 50.7	- 0.23	59 46.5	- 0.47	10 12.0	2.36	11.4
27	16 17.1	16 14.4	59 39.4	0.72	59 29.4	0.96	11 7.6	2.27	12.4
28	16 10.9	16 6.7	59 16.5	1.18	59 1.1	1.38	12 0.8	2.18	13.4
29	16 1.9	15 56.5	58 43.3	- 1.57	58 23.5	- 1.72	12 52.2	2.10	14.4

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 1.					TUESDAY 3.				
0	10 <sup>h</sup> 33 <sup>m</sup> 2.38 <sup>s</sup>	2.2783	N. 6° 30' 25.9"	10.538	0	12 <sup>h</sup> 18 <sup>m</sup> 1.77 <sup>s</sup>	2.1111	S. 2° 2' 19.6"	10.433
1	10 35 18.95	2.2741	6 19 53.5	10.563	1	12 20 8.36	2.1088	2 12 44.8	10.407
2	10 37 35.27	2.2698	6 9 19.6	10.576	2	12 22 14.80	2.1061	2 23 8.4	10.380
3	10 39 51.33	2.2655	5 58 44.4	10.597	3	12 24 21.09	2.1037	2 33 30.4	10.353
4	10 42 7.13	2.2613	5 48 7.9	10.618	4	12 26 27.24	2.1013	2 43 50.8	10.325
5	10 44 22.68	2.2571	5 37 30.2	10.638	5	12 28 33.25	2.0990	2 54 9.4	10.296
6	10 46 37.98	2.2529	5 26 51.3	10.657	6	12 30 39.12	2.0967	3 4 26.3	10.267
7	10 48 53.03	2.2488	5 16 11.4	10.673	7	12 32 44.86	2.0945	3 14 41.4	10.238
8	10 51 7.83	2.2447	5 5 30.5	10.689	8	12 34 50.46	2.0923	3 24 54.6	10.204
9	10 53 22.39	2.2406	4 54 48.7	10.704	9	12 36 55.93	2.0902	3 35 5.9	10.173
10	10 55 36.70	2.2365	4 44 6.0	10.717	10	12 39 1.28	2.0881	3 45 15.3	10.141
11	10 57 50.77	2.2325	4 33 22.6	10.729	11	12 41 6.50	2.0860	3 55 22.8	10.108
12	11 0 4.60	2.2285	4 22 38.5	10.740	12	12 43 11.60	2.0840	4 5 28.3	10.074
13	11 2 18.10	2.2246	4 11 53.8	10.750	13	12 45 16.58	2.0820	4 15 31.7	10.039
14	11 4 31.55	2.2207	4 1 8.5	10.759	14	12 47 21.44	2.0801	4 25 33.0	10.003
15	11 6 44.67	2.2168	3 50 22.7	10.767	15	12 49 26.19	2.0782	4 35 32.1	9.967
16	11 8 57.56	2.2129	3 39 36.5	10.773	16	12 51 30.82	2.0763	4 45 29.0	9.930
17	11 11 10.22	2.2091	3 28 49.9	10.778	17	12 53 35.34	2.0745	4 55 23.7	9.893
18	11 13 22.65	2.2053	3 18 3.1	10.782	18	12 55 39.76	2.0727	5 5 16.2	9.856
19	11 15 34.86	2.2016	3 7 16.1	10.785	19	12 57 44.07	2.0710	5 15 6.4	9.817
20	11 17 46.85	2.1979	2 56 28.9	10.787	20	12 59 48.28	2.0693	5 24 54.2	9.777
21	11 19 58.61	2.1943	2 45 41.6	10.788	21	13 1 52.39	2.0677	5 34 39.6	9.737
22	11 22 10.16	2.1907	2 34 54.3	10.787	22	13 3 56.40	2.0661	5 44 22.6	9.696
23	11 24 21.49	2.1871	N. 2° 24' 7.1"	10.786	23	13 6 0.32	2.0645	S. 5° 54' 3.1"	9.655
MONDAY 2.					WEDNESDAY 4.				
0	11 26 32.61	2.1836	N. 2° 13' 20.0"	10.783	0	13 8 4.14	2.0630	S. 6° 3' 41.2"	9.614
1	11 28 43.52	2.1801	2 2 33.1	10.780	1	13 10 7.87	2.0615	6 13 16.8	9.572
2	11 30 54.22	2.1767	1 51 46.4	10.776	2	13 12 11.52	2.0601	6 22 49.8	9.528
3	11 33 4.72	2.1732	1 41 0.0	10.770	3	13 14 15.08	2.0586	6 32 20.1	9.483
4	11 35 15.01	2.1697	1 30 14.0	10.763	4	13 16 18.55	2.0572	6 41 47.8	9.439
5	11 37 25.09	2.1663	1 19 28.4	10.755	5	13 18 21.94	2.0559	6 51 12.8	9.395
6	11 39 34.97	2.1631	1 8 43.4	10.746	6	13 20 25.26	2.0547	7 0 35.2	9.350
7	11 41 44.66	2.1599	0 57 58.9	10.737	7	13 22 28.50	2.0534	7 9 54.8	9.304
8	11 43 54.16	2.1567	0 47 15.0	10.727	8	13 24 31.67	2.0522	7 19 11.6	9.258
9	11 46 3.46	2.1535	0 36 31.7	10.718	9	13 26 34.76	2.0510	7 28 25.7	9.211
10	11 48 12.58	2.1504	0 25 49.1	10.703	10	13 28 37.79	2.0499	7 37 36.9	9.163
11	11 50 21.51	2.1473	0 15 7.3	10.689	11	13 30 40.75	2.0488	7 46 45.2	9.114
12	11 52 30.25	2.1442	N. 0° 4' 26.4"	10.674	12	13 32 43.64	2.0477	7 55 50.6	9.066
13	11 54 38.81	2.1412	S. 0° 6' 13.6"	10.659	13	13 34 46.47	2.0467	8 4 53.1	9.017
14	11 56 47.20	2.1383	0 16 52.7	10.643	14	13 36 49.24	2.0457	8 13 52.6	8.967
15	11 58 55.41	2.1353	0 27 30.8	10.626	15	13 38 51.95	2.0447	8 22 49.1	8.917
16	12 1 3.44	2.1324	0 38 7.8	10.607	16	13 40 54.61	2.0438	8 31 42.6	8.866
17	12 3 11.30	2.1296	0 48 43.7	10.588	17	13 42 57.21	2.0429	8 40 33.0	8.814
18	12 5 19.00	2.1269	0 59 18.4	10.568	18	13 44 59.76	2.0421	8 49 20.3	8.762
19	12 7 26.53	2.1242	1 9 51.9	10.548	19	13 47 2.26	2.0413	8 58 4.5	8.710
20	12 9 33.90	2.1214	1 20 24.2	10.526	20	13 49 4.71	2.0405	9 6 45.5	8.658
21	12 11 41.10	2.1187	1 30 55.1	10.504	21	13 51 7.12	2.0397	9 15 23.4	8.605
22	12 13 48.14	2.1161	1 41 24.7	10.482	22	13 53 9.48	2.0390	9 23 58.1	8.551
23	12 15 55.03	2.1136	1 51 52.9	10.458	23	13 55 11.80	2.0383	9 32 29.5	8.497
24	12 18 1.77	2.1111	S. 2° 2' 19.6"	10.433	24	13 57 14.08	2.0377	S. 9° 40' 57.7"	8.443

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 5.					SATURDAY 7.				
0	13 57 14.08	2.0377	S. 9 40' 57.7"	8.442	0	15 34 50.13	2.0379	S. 15 15' 30.1"	5.358
1	13 59 16.32	2.0371	9 49 22.6	8.387	1	15 36 52.42	2.0363	15 20 49.4	5.266
2	14 1 18.53	2.0365	9 57 44.2	8.332	2	15 38 54.73	2.0367	15 26 4.4	5.213
3	14 3 20.70	2.0359	10 6 2.4	8.276	3	15 40 57.07	2.0362	15 31 15.0	5.140
4	14 5 22.84	2.0354	10 14 17.3	8.220	4	15 42 59.44	2.0366	15 36 21.2	5.067
5	14 7 24.95	2.0350	10 22 28.8	8.163	5	15 45 1.85	2.0404	15 41 23.0	4.993
6	14 9 27.04	2.0346	10 30 36.8	8.106	6	15 47 4.29	2.0400	15 46 20.4	4.919
7	14 11 29.10	2.0341	10 38 41.4	8.047	7	15 49 6.76	2.0414	15 51 13.3	4.845
8	14 13 31.13	2.0337	10 46 42.5	7.989	8	15 51 9.26	2.0419	15 56 1.8	4.771
9	14 15 33.14	2.0333	10 54 40.1	7.931	9	15 53 11.79	2.0425	16 0 45.8	4.696
10	14 17 35.13	2.0330	11 2 34.2	7.872	10	15 55 14.36	2.0431	16 5 25.3	4.621
11	14 19 37.10	2.0327	11 10 24.7	7.812	11	15 57 16.96	2.0436	16 10 0.3	4.546
12	14 21 39.05	2.0324	11 18 11.6	7.752	12	15 59 19.59	2.0442	16 14 30.8	4.471
13	14 23 40.99	2.0322	11 25 54.9	7.690	13	16 1 22.26	2.0448	16 18 56.8	4.396
14	14 25 42.91	2.0319	11 33 34.6	7.628	14	16 3 24.97	2.0454	16 23 18.2	4.319
15	14 27 44.82	2.0317	11 41 10.7	7.571	15	16 5 27.71	2.0460	16 27 35.1	4.243
16	14 29 46.72	2.0316	11 48 43.1	7.509	16	16 7 30.49	2.0466	16 31 47.4	4.167
17	14 31 48.61	2.0314	11 56 11.8	7.447	17	16 9 33.30	2.0472	16 35 55.1	4.090
18	14 33 50.49	2.0313	12 3 36.8	7.385	18	16 11 36.15	2.0478	16 39 58.2	4.013
19	14 35 52.36	2.0312	12 10 58.0	7.322	19	16 13 39.04	2.0484	16 43 56.7	3.936
20	14 37 54.23	2.0312	12 18 15.4	7.259	20	16 15 41.96	2.0490	16 47 50.6	3.859
21	14 39 56.10	2.0311	12 25 29.1	7.196	21	16 17 44.92	2.0496	16 51 39.8	3.782
22	14 41 57.96	2.0311	12 32 39.0	7.132	22	16 19 47.92	2.0502	16 55 24.4	3.704
23	14 43 59.83	2.0312	S. 12 39 45.0	7.068	23	16 21 50.95	2.0508	S. 16 59 4.3	3.626
FRIDAY 6.					SUNDAY 8.				
0	14 46 1.70	2.0312	S. 12 46 47.2	7.004	0	16 23 54.02	2.0515	S. 17 2 39.5	3.547
1	14 48 3.57	2.0312	12 53 45.5	6.939	1	16 25 57.13	2.0521	17 6 10.0	3.469
2	14 50 5.44	2.0312	13 0 39.9	6.874	2	16 28 0.28	2.0527	17 9 35.8	3.391
3	14 52 7.32	2.0314	13 7 30.4	6.809	3	16 30 3.46	2.0533	17 12 56.9	3.313
4	14 54 9.21	2.0315	13 14 17.0	6.743	4	16 32 6.68	2.0540	17 16 13.3	3.233
5	14 56 11.10	2.0316	13 20 59.6	6.677	5	16 34 9.94	2.0547	17 19 24.9	3.154
6	14 58 13.00	2.0318	13 27 38.2	6.610	6	16 36 13.24	2.0553	17 22 31.8	3.075
7	15 0 14.91	2.0320	13 34 12.8	6.543	7	16 38 16.58	2.0559	17 25 33.9	2.995
8	15 2 16.84	2.0322	13 40 43.4	6.476	8	16 40 19.95	2.0565	17 28 31.2	2.915
9	15 4 18.78	2.0324	13 47 9.9	6.409	9	16 42 23.36	2.0572	17 31 23.7	2.835
10	15 6 20.73	2.0327	13 53 32.4	6.341	10	16 44 26.81	2.0578	17 34 11.4	2.756
11	15 8 22.70	2.0329	13 59 50.8	6.272	11	16 46 30.30	2.0584	17 36 54.3	2.675
12	15 10 24.68	2.0332	14 6 5.1	6.204	12	16 48 33.82	2.0590	17 39 32.4	2.594
13	15 12 26.68	2.0335	14 12 15.3	6.135	13	16 50 37.38	2.0597	17 42 5.6	2.513
14	15 14 28.70	2.0338	14 18 21.3	6.066	14	16 52 40.98	2.0603	17 44 34.0	2.433
15	15 16 30.74	2.0342	14 24 23.2	5.997	15	16 54 44.61	2.0608	17 46 57.6	2.352
16	15 18 32.80	2.0345	14 30 20.9	5.927	16	16 56 48.28	2.0614	17 49 16.3	2.271
17	15 20 34.88	2.0349	14 36 14.4	5.857	17	16 58 51.98	2.0620	17 51 30.1	2.190
18	15 22 36.99	2.0353	14 42 3.7	5.787	18	17 0 55.72	2.0626	17 53 39.1	2.109
19	15 24 39.12	2.0357	14 47 48.8	5.716	19	17 2 59.49	2.0632	17 55 43.2	2.027
20	15 26 41.27	2.0360	14 53 29.6	5.645	20	17 5 3.30	2.0637	17 57 42.4	1.946
21	15 28 43.44	2.0364	14 59 6.2	5.574	21	17 7 7.14	2.0643	17 59 36.6	1.863
22	15 30 45.64	2.0369	15 4 38.5	5.502	22	17 9 11.01	2.0648	18 1 25.9	1.781
23	15 32 47.87	2.0374	15 10 6.5	5.430	23	17 11 14.92	2.0654	18 3 10.3	1.699
24	15 34 50.13	2.0379	S. 15 15 30.1	5.358	24	17 13 18.86	2.0659	S. 18 4 49.7	1.617

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 9.					WEDNESDAY 11.				
0	17 13 18.86	2.0659	S. 18° 4' 49.7"	1.817	0	18 52 53.46	2.0779	S. 17° 46' 17.6"	2.393
1	17 15 22.83	2.0664	18 6 24.3	1.534	1	18 54 58.13	2.0778	17 43 51.5	2.477
2	17 17 26.83	2.0669	18 7 53.9	1.459	2	18 57 2.80	2.0777	17 41 20.4	2.560
3	17 19 30.86	2.0675	18 9 18.6	1.379	3	18 59 7.46	2.0776	17 38 44.3	2.642
4	17 21 34.93	2.0681	18 10 38.3	1.297	4	19 1 12.11	2.0774	17 36 3.3	2.724
5	17 23 39.03	2.0686	18 11 53.0	1.203	5	19 3 16.75	2.0773	17 33 17.4	2.807
6	17 25 43.16	2.0691	18 13 2.7	1.190	6	19 5 21.38	2.0771	17 30 26.5	2.889
7	17 27 47.32	2.0696	18 14 7.4	1.037	7	19 7 26.00	2.0769	17 27 30.7	2.971
8	17 29 51.50	2.0699	18 15 7.1	0.964	8	19 9 30.61	2.0767	17 24 30.0	3.052
9	17 31 55.71	2.0704	18 16 1.9	0.872	9	19 11 35.21	2.0765	17 21 24.4	3.134
10	17 33 59.95	2.0709	18 16 51.7	0.788	10	19 13 39.79	2.0763	17 18 12.9	3.216
11	17 36 4.22	2.0713	18 17 36.5	0.705	11	19 15 44.36	2.0761	17 14 58.5	3.297
12	17 38 8.51	2.0717	18 18 16.3	0.621	12	19 17 48.92	2.0758	17 11 38.3	3.377
13	17 40 12.83	2.0722	18 18 51.1	0.537	13	19 19 53.46	2.0755	17 8 13.2	3.458
14	17 42 17.17	2.0726	18 19 20.8	0.453	14	19 21 57.98	2.0752	17 4 43.3	3.539
15	17 44 21.53	2.0729	18 19 45.5	0.370	15	19 24 2.49	2.0750	17 1 8.5	3.620
16	17 46 25.92	2.0733	18 20 5.2	0.287	16	19 26 6.98	2.0747	16 57 28.9	3.700
17	17 48 30.33	2.0737	18 20 19.9	0.203	17	19 28 11.45	2.0744	16 53 44.5	3.781
18	17 50 34.76	2.0740	18 20 29.6	0.119	18	19 30 15.91	2.0741	16 49 55.2	3.861
19	17 52 39.21	2.0743	18 20 34.2	- 0.035	19	19 32 20.35	2.0737	16 46 1.2	3.940
20	17 54 43.68	2.0747	18 20 33.8	+ 0.048	20	19 34 24.76	2.0733	16 42 2.4	4.020
21	17 56 48.17	2.0750	18 20 28.4	0.132	21	19 36 29.15	2.0730	16 37 58.8	4.099
22	17 58 52.68	2.0752	18 20 17.9	0.217	22	19 38 33.52	2.0726	16 33 50.5	4.177
23	18 0 57.20	2.0755	S. 18 20 2.4	0.301	23	19 40 37.86	2.0722	S. 16 29 37.5	4.256
TUESDAY 10.					THURSDAY 12.				
0	18 3 1.74	2.0758	S. 18 19 41.8	0.385	0	19 42 42.18	2.0718	S. 16 25 19.8	4.334
1	18 5 6.30	2.0761	18 19 16.2	0.469	1	19 44 46.48	2.0714	16 20 57.4	4.413
2	18 7 10.87	2.0763	18 18 45.5	0.553	2	19 46 50.75	2.0710	16 16 30.3	4.491
3	18 9 15.46	2.0766	18 18 9.8	0.638	3	19 48 55.00	2.0706	16 11 58.5	4.568
4	18 11 20.06	2.0768	18 17 29.0	0.722	4	19 50 59.22	2.0702	16 7 22.1	4.645
5	18 13 24.67	2.0769	18 16 43.2	0.805	5	19 53 3.42	2.0697	16 2 41.1	4.723
6	18 15 29.29	2.0771	18 15 52.4	0.889	6	19 55 7.59	2.0693	15 57 55.4	4.800
7	18 17 33.93	2.0773	18 14 56.5	0.973	7	19 57 11.73	2.0688	15 53 5.1	4.876
8	18 19 38.57	2.0774	18 13 55.6	1.057	8	19 59 15.85	2.0684	15 48 10.3	4.952
9	18 21 43.22	2.0776	18 12 49.7	1.141	9	20 1 19.94	2.0679	15 43 10.9	5.027
10	18 23 47.88	2.0777	18 11 38.7	1.225	10	20 3 24.00	2.0674	15 38 7.0	5.103
11	18 25 52.55	2.0778	18 10 22.7	1.309	11	20 5 28.03	2.0669	15 32 58.5	5.179
12	18 27 57.22	2.0779	18 9 1.6	1.393	12	20 7 32.03	2.0664	15 27 45.5	5.253
13	18 30 1.90	2.0780	18 7 35.5	1.477	13	20 9 36.00	2.0659	15 22 28.1	5.328
14	18 32 6.58	2.0781	18 6 4.4	1.560	14	20 11 39.94	2.0654	15 17 6.2	5.403
15	18 34 11.27	2.0782	18 4 28.3	1.644	15	20 13 43.85	2.0649	15 11 39.8	5.477
16	18 36 15.96	2.0782	18 2 47.1	1.728	16	20 15 47.73	2.0644	15 6 9.0	5.550
17	18 38 20.65	2.0783	18 1 0.9	1.812	17	20 17 51.58	2.0639	15 0 33.8	5.622
18	18 40 25.34	2.0783	17 59 9.7	1.895	18	20 19 55.40	2.0634	14 54 54.3	5.695
19	18 42 30.03	2.0783	17 57 13.5	1.978	19	20 21 59.19	2.0628	14 49 10.4	5.767
20	18 44 34.72	2.0783	17 55 12.3	2.062	20	20 24 2.94	2.0623	14 43 22.2	5.839
21	18 46 39.41	2.0783	17 53 6.1	2.145	21	20 26 6.66	2.0617	14 37 29.7	5.911
22	18 48 44.10	2.0781	17 50 54.9	2.228	22	20 28 10.35	2.0612	14 31 32.9	5.982
23	18 50 48.78	2.0780	17 48 38.7	2.311	23	20 30 14.01	2.0607	14 25 31.8	6.053
24	18 52 53.46	2.0779	S. 17 46 17.6	2.393	24	20 32 17.64	2.0602	S. 14 19 26.5	6.123

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 13.					SUNDAY 15.				
0	20 <sup>h</sup> 32 <sup>m</sup> 17.64	2.0603	S. 14° 19' 26.5"	6.193	0	22 <sup>h</sup> 10 <sup>m</sup> 37.54	2.0406	S. 8° 13' 19.2"	8.926
1	20 34 21.23	2.0596	14 13 17.0	6.193	1	22 12 39.97	2.0404	8 4 22.3	8.909
2	20 36 24.79	2.0591	14 7 3.3	6.999	2	22 14 42.39	2.0403	7 55 22.9	9.019
3	20 38 28.32	2.0586	14 0 45.5	6.339	3	22 16 44.81	2.0403	7 46 20.9	9.055
4	20 40 31.82	2.0580	13 54 23.5	6.409	4	22 18 47.23	2.0403	7 37 16.3	9.097
5	20 42 35.28	2.0574	13 47 57.3	6.471	5	22 20 49.65	2.0409	7 28 9.2	9.138
6	20 44 38.71	2.0569	13 41 27.0	6.538	6	22 22 52.06	2.0409	7 18 50.7	9.178
7	20 46 42.11	2.0563	13 34 52.7	6.605	7	22 24 54.47	2.0403	7 9 47.8	9.219
8	20 48 45.47	2.0557	13 28 14.4	6.673	8	22 26 56.89	2.0404	7 0 33.4	9.260
9	20 50 48.80	2.0552	13 21 32.0	6.739	9	22 28 59.32	2.0405	6 51 16.6	9.299
10	20 52 52.10	2.0547	13 14 45.7	6.804	10	22 31 1.75	2.0405	6 41 57.5	9.337
11	20 54 55.37	2.0542	13 7 55.5	6.870	11	22 33 4.18	2.0406	6 32 36.2	9.374
12	20 56 58.61	2.0537	13 1 1.3	6.936	12	22 35 6.62	2.0406	6 23 12.7	9.410
13	20 59 1.82	2.0532	12 54 3.2	7.000	13	22 37 9.07	2.0410	6 13 47.0	9.446
14	21 1 4.99	2.0526	12 47 1.3	7.064	14	22 39 11.54	2.0412	6 4 19.2	9.482
15	21 3 8.13	2.0521	12 39 55.5	7.129	15	22 41 14.02	2.0414	5 54 49.2	9.517
16	21 5 11.24	2.0516	12 32 45.9	7.191	16	22 43 16.51	2.0417	5 45 17.2	9.550
17	21 7 14.32	2.0511	12 25 32.5	7.254	17	22 45 19.02	2.0419	5 35 43.2	9.589
18	21 9 17.37	2.0506	12 18 15.4	7.317	18	22 47 21.54	2.0422	5 26 7.3	9.615
19	21 11 20.39	2.0501	12 10 54.5	7.378	19	22 49 24.08	2.0425	5 16 29.4	9.647
20	21 13 23.38	2.0496	12 3 30.0	7.439	20	22 51 26.64	2.0429	5 6 49.6	9.678
21	21 15 26.34	2.0491	11 56 1.8	7.500	21	22 53 29.23	2.0433	4 57 8.0	9.708
22	21 17 29.27	2.0486	11 48 30.0	7.560	22	22 55 31.84	2.0437	4 47 24.6	9.738
23	21 19 32.17	2.0482	S. 11 40 54.6	7.600	23	22 57 34.48	2.0442	S. 4 37 39.5	9.767
SATURDAY 14.					MONDAY 16.				
0	21 21 35.05	2.0477	S. 11 33 15.6	7.679	0	22 59 37.14	2.0446	S. 4 27 52.6	9.795
1	21 23 37.90	2.0472	11 25 33.1	7.738	1	23 1 39.83	2.0451	4 18 4.1	9.822
2	21 25 40.72	2.0467	11 17 47.1	7.796	2	23 3 42.55	2.0457	4 8 14.0	9.848
3	21 27 43.51	2.0463	11 9 57.6	7.853	3	23 5 45.31	2.0462	3 58 22.3	9.874
4	21 29 46.28	2.0460	11 2 4.7	7.910	4	23 7 48.10	2.0468	3 48 29.1	9.899
5	21 31 49.03	2.0456	10 54 8.4	7.967	5	23 9 50.93	2.0474	3 38 34.4	9.923
6	21 33 51.75	2.0452	10 46 8.7	8.022	6	23 11 53.79	2.0480	3 28 38.3	9.947
7	21 35 54.45	2.0447	10 38 5.7	8.077	7	23 13 56.69	2.0487	3 18 40.8	9.970
8	21 37 57.12	2.0443	10 29 59.4	8.133	8	23 15 59.64	2.0493	3 8 41.9	9.993
9	21 39 59.77	2.0440	10 21 49.8	8.187	9	23 18 2.63	2.0502	2 58 41.8	10.019
10	21 42 2.40	2.0437	10 13 37.0	8.240	10	23 20 5.67	2.0510	2 48 40.5	10.039
11	21 44 5.01	2.0434	10 5 21.0	8.293	11	23 22 8.75	2.0518	2 38 38.0	10.059
12	21 46 7.61	2.0432	9 57 1.9	8.345	12	23 24 11.88	2.0526	2 28 34.3	10.071
13	21 48 10.19	2.0428	9 48 39.6	8.397	13	23 26 15.06	2.0535	2 18 29.5	10.088
14	21 50 12.75	2.0425	9 40 14.2	8.448	14	23 28 18.30	2.0544	2 8 23.7	10.105
15	21 52 15.29	2.0422	9 31 45.8	8.498	15	23 30 21.59	2.0553	1 58 16.9	10.122
16	21 54 17.81	2.0419	9 23 14.4	8.548	16	23 32 24.94	2.0563	1 48 9.1	10.138
17	21 56 20.31	2.0416	9 14 40.0	8.597	17	23 34 28.35	2.0573	1 38 0.3	10.153
18	21 58 22.80	2.0414	9 6 2.7	8.646	18	23 36 31.81	2.0583	1 27 50.7	10.167
19	22 0 25.28	2.0412	8 57 22.5	8.694	19	23 38 35.34	2.0594	1 17 40.3	10.179
20	22 2 27.75	2.0411	8 48 39.4	8.743	20	23 40 38.94	2.0605	1 7 29.2	10.192
21	22 4 30.21	2.0409	8 39 53.5	8.788	21	23 42 42.60	2.0616	0 57 17.3	10.204
22	22 6 32.66	2.0408	8 31 4.8	8.834	22	23 44 46.33	2.0626	0 47 4.7	10.214
23	22 8 35.10	2.0407	8 22 13.4	8.880	23	23 46 50.13	2.0640	0 36 51.6	10.223
24	22 10 37.54	2.0406	S. 8 13 19.2	8.926	24	23 48 54.01	2.0652	S. 0 26 37.9	10.232

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 17.					THURSDAY 19.				
0	<sup>h</sup> 23 <sup>m</sup> 48 <sup>s</sup> 54.01	2.0652	S. 0° 26' 37.9"	10.3239	0	<sup>h</sup> 1° 30' 8.49	2.1670	N. 7° 38' 25.2"	9.6229
1	23 50 57.96	2.0655	0 16 23.7	10.341	1	1 32 18.60	2.1700	7 48 1.9	9.584
2	23 53 1.99	2.0678	S. 0 6 9.0	10.348	2	1 34 28.89	2.1730	7 57 36.5	9.558
3	23 55 6.10	2.0692	N. 0 4 6.1	10.355	3	1 36 39.36	2.1760	8 7 8.9	9.532
4	23 57 10.29	2.0705	0 14 21.6	10.361	4	1 38 50.01	2.1791	8 16 39.1	9.484
5	23 59 14.56	2.0719	0 24 37.4	10.365	5	1 41 0.85	2.1822	8 26 7.0	9.445
6	0 1 18.92	2.0734	0 34 53.4	10.368	6	1 43 11.87	2.1853	8 35 32.5	9.404
7	0 3 23.37	2.0749	0 45 9.6	10.372	7	1 45 23.08	2.1884	8 44 55.5	9.363
8	0 5 27.91	2.0764	0 55 26.0	10.375	8	1 47 34.48	2.1917	8 54 16.1	9.322
9	0 7 32.54	2.0780	1 5 42.6	10.377	9	1 49 46.08	2.1949	9 3 34.1	9.278
10	0 9 37.27	2.0796	1 15 59.2	10.377	10	1 51 57.87	2.1982	9 12 49.5	9.234
11	0 11 42.09	2.0812	1 26 15.8	10.377	11	1 54 9.86	2.2014	9 22 2.2	9.189
12	0 13 47.01	2.0828	1 36 32.4	10.376	12	1 56 22.04	2.2047	9 31 12.2	9.143
13	0 15 52.03	2.0846	1 46 48.9	10.373	13	1 58 34.42	2.2080	9 40 19.4	9.097
14	0 17 57.16	2.0863	1 57 5.2	10.370	14	2 0 47.00	2.2113	9 49 23.8	9.049
15	0 20 2.39	2.0881	2 7 21.3	10.367	15	2 2 59.78	2.2147	9 58 25.3	9.000
16	0 22 7.73	2.0899	2 17 37.2	10.362	16	2 5 12.77	2.2182	10 7 23.8	8.949
17	0 24 13.18	2.0918	2 27 52.7	10.355	17	2 7 25.96	2.2216	10 16 19.2	8.898
18	0 26 18.74	2.0937	2 38 7.8	10.348	18	2 9 39.36	2.2251	10 25 11.5	8.846
19	0 28 24.42	2.0956	2 48 22.5	10.340	19	2 11 52.97	2.2286	10 34 0.7	8.793
20	0 30 30.21	2.0975	2 58 36.8	10.334	20	2 14 6.79	2.2320	10 42 46.7	8.740
21	0 32 36.12	2.0995	3 8 50.6	10.325	21	2 16 20.81	2.2355	10 51 29.5	8.686
22	0 34 42.15	2.1015	3 19 3.8	10.315	22	2 18 35.05	2.2391	11 0 9.0	8.630
23	0 36 48.30	2.1036	N. 3 29 16.4	10.304	23	2 20 49.50	2.2426	N. 11 8 45.1	8.572
WEDNESDAY 18.					FRIDAY 20.				
0	0 38 54.58	2.1057	N. 3 39 28.3	10.192	0	2 23 4.16	2.2462	N. 11 17 17.7	8.514
1	0 41 0.98	2.1079	3 49 39.4	10.179	1	2 25 19.04	2.2498	11 25 46.8	8.456
2	0 43 7.52	2.1101	3 59 49.8	10.166	2	2 27 34.14	2.2534	11 34 12.4	8.397
3	0 45 14.19	2.1123	4 9 59.3	10.151	3	2 29 49.45	2.2570	11 42 34.4	8.336
4	0 47 20.99	2.1145	4 20 7.9	10.136	4	2 32 4.98	2.2607	11 50 52.7	8.273
5	0 49 27.93	2.1168	4 30 15.6	10.119	5	2 34 20.73	2.2643	11 59 7.2	8.210
6	0 51 35.04	2.1192	4 40 22.2	10.101	6	2 36 36.70	2.2680	12 7 17.9	8.147
7	0 53 42.23	2.1215	4 50 27.7	10.082	7	2 38 52.89	2.2717	12 15 24.8	8.082
8	0 55 49.59	2.1238	5 0 32.1	10.064	8	2 41 9.30	2.2754	12 23 27.8	8.016
9	0 57 57.09	2.1262	5 10 35.4	10.045	9	2 43 25.94	2.2791	12 31 26.8	7.949
10	1 0 4.74	2.1287	5 20 37.5	10.024	10	2 45 42.80	2.2828	12 39 21.7	7.882
11	1 2 12.54	2.1313	5 30 38.3	10.002	11	2 47 59.88	2.2866	12 47 12.6	7.813
12	1 4 20.50	2.1339	5 40 37.7	9.978	12	2 50 17.19	2.2903	12 54 59.3	7.743
13	1 6 28.61	2.1364	5 50 35.7	9.955	13	2 52 34.72	2.2941	13 2 41.8	7.673
14	1 8 36.87	2.1390	6 0 32.3	9.931	14	2 54 52.48	2.2979	13 10 20.1	7.602
15	1 10 45.29	2.1417	6 10 27.4	9.905	15	2 57 10.47	2.3017	13 17 54.0	7.529
16	1 12 53.87	2.1443	6 20 20.9	9.877	16	2 59 28.68	2.3054	13 25 23.5	7.455
17	1 15 2.61	2.1470	6 30 12.7	9.849	17	3 1 47.12	2.3092	13 32 48.6	7.380
18	1 17 11.51	2.1498	6 40 2.8	9.821	18	3 4 5.79	2.3130	13 40 9.1	7.304
19	1 19 20.58	2.1526	6 49 51.2	9.792	19	3 6 24.68	2.3168	13 47 25.0	7.227
20	1 21 29.82	2.1554	6 59 37.8	9.762	20	3 8 43.80	2.3206	13 54 36.3	7.150
21	1 23 39.23	2.1582	7 9 22.6	9.731	21	3 11 3.15	2.3243	14 1 43.0	7.072
22	1 25 48.81	2.1611	7 19 5.5	9.698	22	3 13 22.72	2.3281	14 8 45.0	6.993
23	1 27 58.56	2.1640	7 28 46.4	9.664	23	3 15 42.52	2.3319	14 15 42.2	6.912
24	1 30 8.49	2.1670	N. 7 38 25.2	9.629	24	3 18 2.55	2.3357	N. 14 22 34.5	6.831

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 21.					MONDAY 23.				
0	3 18 2.55	2.3357	N.14 22 34.5	6.831	0	5 14 9.89	2.4898	N.18 0 3.0	1.936
1	3 20 22.80	2.3394	14 29 21.9	6.748	1	5 16 39.34	2.4919	18 1 55.6	1.817
2	3 22 43.28	2.3439	14 36 4.3	6.665	2	5 19 8.92	2.4940	18 3 41.1	1.698
3	3 25 3.99	2.3470	14 42 41.7	6.581	3	5 21 38.62	2.4960	18 5 19.4	1.578
4	3 27 24.92	2.3508	14 49 14.0	6.496	4	5 24 8.44	2.4980	18 6 50.5	1.458
5	3 29 46.08	2.3546	14 55 41.2	6.409	5	5 26 38.38	2.4999	18 8 14.4	1.338
6	3 32 7.47	2.3583	15 2 3.1	6.322	6	5 29 8.43	2.5017	18 9 31.1	1.218
7	3 34 29.08	2.3620	15 8 19.8	6.234	7	5 31 38.59	2.5035	18 10 40.6	1.097
8	3 36 50.91	2.3657	15 14 31.2	6.146	8	5 34 8.85	2.5051	18 11 42.8	0.977
9	3 39 12.96	2.3694	15 20 37.3	6.057	9	5 36 39.20	2.5068	18 12 37.8	0.856
10	3 41 35.24	2.3731	15 26 38.0	5.968	10	5 39 9.64	2.5083	18 13 25.5	0.734
11	3 43 57.74	2.3767	15 32 33.2	5.874	11	5 41 40.18	2.5097	18 14 5.8	0.611
12	3 46 20.45	2.3803	15 38 22.9	5.782	12	5 44 10.81	2.5111	18 14 38.8	0.489
13	3 48 43.38	2.3840	15 44 7.0	5.688	13	5 46 41.52	2.5124	18 15 4.5	0.366
14	3 51 6.53	2.3877	15 49 45.5	5.594	14	5 49 12.30	2.5137	18 15 22.8	0.243
15	3 53 29.90	2.3913	15 55 18.3	5.499	15	5 51 43.16	2.5149	18 15 33.7	+ 0.120
16	3 55 53.48	2.3948	16 0 45.4	5.403	16	5 54 14.09	2.5160	18 15 37.2	- 0.002
17	3 58 17.28	2.3984	16 6 6.7	5.306	17	5 56 45.08	2.5171	18 15 33.4	0.125
18	4 0 41.29	2.4019	16 11 22.1	5.208	18	5 59 16.14	2.5181	18 15 22.2	0.248
19	4 3 5.51	2.4054	16 16 31.7	5.110	19	6 1 47.25	2.5189	18 15 3.6	0.372
20	4 5 29.94	2.4088	16 21 35.3	5.010	20	6 4 18.41	2.5197	18 14 37.5	0.496
21	4 7 54.57	2.4123	16 26 32.9	4.910	21	6 6 49.62	2.5205	18 14 4.0	0.620
22	4 10 19.41	2.4158	16 31 24.5	4.810	22	6 9 20.87	2.5212	18 13 23.1	0.743
23	4 12 44.46	2.4192	N.16 36 10.1	4.708	23	6 11 52.16	2.5218	N.18 12 34.8	0.867
SUNDAY 22.					TUESDAY 24.				
0	4 15 9.71	2.4226	N.16 40 49.5	4.605	0	6 14 23.49	2.5224	N.18 11 39.0	0.982
1	4 17 35.16	2.4258	16 45 22.7	4.502	1	6 16 54.85	2.5228	18 10 35.8	1.115
2	4 20 0.81	2.4291	16 49 49.7	4.397	2	6 19 26.23	2.5232	18 9 25.2	1.238
3	4 22 26.65	2.4323	16 54 10.4	4.290	3	6 21 57.63	2.5234	18 8 7.2	1.362
4	4 24 52.68	2.4354	16 58 24.8	4.187	4	6 24 29.04	2.5236	18 6 41.8	1.486
5	4 27 18.90	2.4386	17 2 32.9	4.082	5	6 27 0.46	2.5237	18 5 8.9	1.610
6	4 29 45.31	2.4417	17 6 34.6	3.974	6	6 29 31.89	2.5238	18 3 28.6	1.733
7	4 32 11.91	2.4448	17 10 29.8	3.866	7	6 32 3.32	2.5238	18 1 40.9	1.857
8	4 34 38.69	2.4479	17 14 18.5	3.757	8	6 34 34.75	2.5237	17 59 45.8	1.979
9	4 37 5.66	2.4509	17 18 0.7	3.648	9	6 37 6.17	2.5236	17 57 43.4	2.102
10	4 39 32.80	2.4538	17 21 36.3	3.538	10	6 39 37.58	2.5233	17 55 33.6	2.224
11	4 42 0.12	2.4567	17 25 5.3	3.427	11	6 42 8.97	2.5231	17 53 16.5	2.347
12	4 44 27.61	2.4596	17 28 27.6	3.316	12	6 44 40.35	2.5228	17 50 52.0	2.469
13	4 46 55.27	2.4624	17 31 43.2	3.204	13	6 47 11.70	2.5223	17 48 20.2	2.591
14	4 49 23.10	2.4652	17 34 52.1	3.091	14	6 49 43.02	2.5217	17 45 41.1	2.713
15	4 51 51.09	2.4679	17 37 54.2	2.978	15	6 52 14.30	2.5210	17 42 54.6	2.835
16	4 54 19.25	2.4706	17 40 49.5	2.865	16	6 54 45.54	2.5203	17 40 0.9	2.956
17	4 56 47.56	2.4732	17 43 38.0	2.751	17	6 57 16.74	2.5196	17 36 59.9	3.077
18	4 59 16.03	2.4757	17 46 19.6	2.636	18	6 59 47.90	2.5188	17 33 51.7	3.197
19	5 1 44.65	2.4782	17 48 54.3	2.520	19	7 2 19.00	2.5179	17 30 36.3	3.317
20	5 4 13.42	2.4807	17 51 22.0	2.404	20	7 4 50.05	2.5170	17 27 13.7	3.436
21	5 6 42.33	2.4830	17 53 42.8	2.288	21	7 7 21.04	2.5160	17 23 44.0	3.555
22	5 9 11.38	2.4853	17 55 56.6	2.171	22	7 9 51.97	2.5148	17 20 7.1	3.674
23	5 11 40.57	2.4876	17 58 3.3	2.053	23	7 12 22.82	2.5136	17 16 23.1	3.792
24	5 14 9.89	2.4898	N.18 0 3.0	1.936	24	7 14 53.60	2.5123	N.17 12 32.1	3.909

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 25.					FRIDAY 27.				
0	7 14 53.60	2.5123	N.17° 12' 32.1"	3.909	0	9 12 56.93	2.3896	N.12° 3' 22.4"	8.613
1	7 17 24.30	2.5110	17 8 34.0	4.027	1	9 15 20.21	2.3892	11 54 43.4	8.687
2	7 19 54.92	2.5097	17 4 28.9	4.143	2	9 17 43.28	2.3898	11 46 0.0	8.758
3	7 22 25.46	2.5082	17 0 16.9	4.258	3	9 20 6.15	2.3795	11 37 12.4	8.898
4	7 24 55.91	2.5067	16 55 57.9	4.374	4	9 22 28.82	2.3761	11 28 20.7	8.997
5	7 27 26.26	2.5051	16 51 32.0	4.489	5	9 24 51.28	2.3798	11 19 24.8	9.085
6	7 29 56.52	2.5034	16 46 59.2	4.603	6	9 27 13.53	2.3691	11 10 24.9	9.032
7	7 32 26.67	2.5017	16 42 19.6	4.717	7	9 29 35.57	2.3657	11 1 21.0	9.097
8	7 34 56.72	2.4999	16 37 33.2	4.830	8	9 31 57.41	2.3692	10 52 13.3	9.160
9	7 37 26.66	2.4981	16 32 40.0	4.943	9	9 34 19.04	2.3587	10 43 1.8	9.292
10	7 39 56.49	2.4962	16 27 40.1	5.053	10	9 36 40.46	2.3552	10 33 46.6	9.384
11	7 42 26.20	2.4943	16 22 33.6	5.164	11	9 39 1.67	2.3518	10 24 27.7	9.445
12	7 44 55.80	2.4923	16 17 20.4	5.275	12	9 41 22.68	2.3484	10 15 5.2	9.404
13	7 47 25.28	2.4901	16 12 0.6	5.384	13	9 43 43.48	2.3449	10 5 39.2	9.462
14	7 49 54.62	2.4879	16 6 34.3	5.493	14	9 46 4.07	2.3413	9 56 9.8	9.518
15	7 52 23.83	2.4857	16 1 1.6	5.599	15	9 48 24.44	2.3378	9 46 37.1	9.573
16	7 54 52.91	2.4836	15 55 22.4	5.707	16	9 50 44.60	2.3343	9 37 1.1	9.627
17	7 57 21.86	2.4813	15 49 36.8	5.813	17	9 53 4.56	2.3309	9 27 21.9	9.680
18	7 59 50.67	2.4789	15 43 44.8	5.919	18	9 55 24.31	2.3274	9 17 39.5	9.732
19	8 2 19.33	2.4765	15 37 46.5	6.023	19	9 57 43.85	2.3239	9 7 54.1	9.782
20	8 4 47.85	2.4741	15 31 42.0	6.127	20	10 0 3.18	2.3204	8 58 5.7	9.830
21	8 7 16.22	2.4716	15 25 31.3	6.229	21	10 2 22.30	2.3169	8 48 14.5	9.877
22	8 9 44.44	2.4690	15 19 14.5	6.330	22	10 4 41.21	2.3135	8 38 20.5	9.923
23	8 12 12.50	2.4663	N.15 12 51.7	6.430	23	10 6 59.92	2.3101	N. 8 28 23.7	9.968
THURSDAY 26.					SATURDAY 28.				
0	8 14 40.40	2.4637	N.15 6 22.9	6.530	0	10 9 18.42	2.3065	N. 8 18 24.2	10.013
1	8 17 8.14	2.4610	14 59 48.1	6.630	1	10 11 36.71	2.3032	8 8 22.1	10.056
2	8 19 35.72	2.4583	14 53 7.3	6.728	2	10 13 54.80	2.2997	7 58 17.5	10.097
3	8 22 3.14	2.4556	14 46 20.7	6.825	3	10 16 12.68	2.2963	7 48 10.5	10.136
4	8 24 30.39	2.4527	14 39 28.3	6.921	4	10 18 30.36	2.2930	7 38 1.2	10.175
5	8 26 57.47	2.4498	14 32 30.2	7.016	5	10 20 47.84	2.2896	7 27 49.5	10.213
6	8 29 24.37	2.4469	14 25 26.4	7.110	6	10 23 5.11	2.2862	7 17 35.6	10.249
7	8 31 51.10	2.4440	14 18 17.0	7.203	7	10 25 22.18	2.2828	7 7 19.6	10.284
8	8 34 17.65	2.4411	14 11 2.1	7.294	8	10 27 39.05	2.2795	6 57 1.5	10.318
9	8 36 44.03	2.4382	14 3 41.7	7.385	9	10 29 55.72	2.2762	6 46 41.4	10.351
10	8 39 10.23	2.4351	13 56 15.9	7.475	10	10 32 12.19	2.2728	6 36 19.4	10.382
11	8 41 36.24	2.4319	13 48 44.7	7.564	11	10 34 28.46	2.2696	6 25 55.6	10.412
12	8 44 2.06	2.4288	13 41 8.2	7.652	12	10 36 44.54	2.2663	6 15 30.0	10.441
13	8 46 27.70	2.4257	13 33 26.5	7.738	13	10 39 0.42	2.2630	6 5 2.7	10.468
14	8 48 53.15	2.4226	13 25 39.7	7.823	14	10 41 16.10	2.2598	5 54 33.8	10.494
15	8 51 18.41	2.4194	13 17 47.8	7.908	15	10 43 31.59	2.2566	5 44 3.4	10.518
16	8 53 43.48	2.4162	13 9 50.8	7.992	16	10 45 46.89	2.2533	5 33 31.6	10.542
17	8 56 8.35	2.4129	13 1 48.8	8.073	17	10 48 1.99	2.2501	5 22 58.4	10.565
18	8 58 33.03	2.4096	12 53 42.0	8.153	18	10 50 16.90	2.2469	5 12 23.8	10.587
19	9 0 57.51	2.4063	12 45 30.4	8.233	19	10 52 31.62	2.2438	5 1 48.0	10.607
20	9 3 21.79	2.4031	12 37 14.0	8.312	20	10 54 46.16	2.2407	4 51 11.0	10.626
21	9 5 45.88	2.3998	12 28 52.9	8.390	21	10 57 0.51	2.2377	4 40 32.9	10.643
22	9 8 9.77	2.3964	12 20 27.2	8.466	22	10 59 14.68	2.2346	4 29 53.8	10.660
23	9 10 33.45	2.3930	12 11 57.0	8.540	23	11 1 28.66	2.2315	4 19 13.7	10.676
24	9 12 56.93	2.3896	N.12 3 22.4	8.613	24	11 3 42.46	2.2285	N. 4 8 32.7	10.690



## GREENWICH MEAN TIME.

## PHASES OF THE MOON.

		d	h	m
☾ Last Quarter . . . . .	Feb.	6	10	37.6
● New Moon . . . . .		14	14	21.8
☾ First Quarter. . . . .		21	23	31.0
○ Full Moon . . . . .		28	16	0.3

		d	h
☾ Apogee . . . . .	Feb.	9	12.5
☾ Perigee . . . . .		25	11.5

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Aldebaran W.	89° 3' 42"	2289	90° 50' 8"	2298	92° 36' 11"	2314	94° 21' 50"	2330
	SATURN W.	79 55 15	2281	81 41 42	2297	83 27 46	2313	85 13 27	2329
	Pollux W.	46 39 24	2448	48 21 50	2455	50 4 6	2465	51 46 9	2474
	Spica E.	44 43 48	2298	42 57 46	2315	41 12 8	2333	39 26 56	2351
	Antares E.	90 29 2	2336	88 43 55	2352	86 59 11	2368	85 14 51	2385
2	Aldebaran W.	103 3 55	2418	104 47 4	2436	106 29 47	2454	108 12 5	2473
	SATURN W.	93 55 38	2417	95 38 48	2435	97 21 33	2453	99 3 52	2472
	Pollux W.	60 12 38	2535	61 53 2	2550	63 33 6	2564	65 12 50	2580
	Regulus W.	23 16 0	2469	24 57 57	2480	26 39 38	2494	28 21 0	2508
	JUPITER W.	18 35 30	2477	20 17 15	2480	21 58 56	2487	23 40 28	2495
	Spica E.	30 47 44	2450	29 5 21	2472	27 23 28	2494	25 42 6	2517
	Antares E.	76 39 25	2476	74 57 38	2494	73 16 17	2514	71 35 23	2534
	SUN E.	142 24 48	2779	140 49 53	2797	139 15 21	2815	137 41 13	2834
3	Pollux W.	73 26 7	2620	75 3 40	2677	76 40 50	2695	78 17 37	2711
	Regulus W.	36 42 38	2587	38 21 51	2603	40 0 42	2620	41 39 10	2637
	JUPITER W.	32 4 18	2561	33 44 7	2575	35 23 36	2591	37 2 43	2607
	Antares E.	63 17 45	2684	61 89 36	2654	60 1 55	2675	58 24 41	2695
	VENUS E.	107 27 7	3011	105 57 8	3031	104 27 34	3051	102 58 24	3071
	α Aquilæ E.	111 50 24	3047	110 21 9	3054	108 52 3	3063	107 23 8	3073
	SUN E.	129 56 29	2997	128 24 44	2946	126 53 23	2905	125 22 26	2863
4	Pollux W.	86 15 56	2796	87 50 29	2814	89 24 39	2831	90 58 27	2847
	Regulus W.	49 45 47	2791	51 21 59	2738	52 57 49	2753	54 33 18	2769
	JUPITER W.	45 12 52	2696	46 49 55	2709	48 26 32	2718	50 2 48	2733
	Antares E.	50 25 32	2802	48 51 7	2824	47 17 10	2846	45 43 42	2869
	VENUS E.	95 38 37	3168	94 11 49	3187	92 45 24	3205	91 19 21	3224
	α Aquilæ E.	100 1 51	3139	98 34 20	3146	97 7 6	3159	95 40 8	3173
	SUN E.	117 53 31	3076	116 24 52	3095	114 56 36	3113	113 28 42	3130
5	Pollux W.	98 42 14	2928	100 13 58	2943	101 45 23	2958	103 16 28	2973
	Regulus W.	62 25 36	2845	63 59 5	2860	65 32 15	2874	67 5 7	2887
	JUPITER W.	57 59 9	2807	59 33 28	2821	61 7 28	2835	62 41 11	2848
	Antares E.	38 3 43	2988	36 33 15	3014	35 3 20	3042	33 34 0	3071
	VENUS E.	84 14 25	3311	82 50 26	3326	81 26 45	3343	80 3 23	3358
	α Aquilæ E.	88 29 40	3248	87 4 28	3264	85 39 35	3281	84 15 1	3296
	SUN E.	106 14 20	3213	104 48 26	3229	103 22 51	3244	101 57 34	3259
6	Regulus W.	74 45 18	2950	76 16 34	2961	77 47 36	2972	79 18 24	2982
	JUPITER W.	70 25 38	2909	71 57 46	2920	73 29 40	2931	75 1 20	2940
	Spica W.	21 22 40	2998	22 52 55	3002	24 23 5	3008	25 53 8	3014
	VENUS E.	73 10 52	3430	71 49 9	3443	70 27 41	3455	69 6 27	3467
	α Aquilæ E.	77 16 52	3379	75 54 12	3397	74 31 52	3415	73 9 52	3432
7	SUN E.	94 55 21	3327	93 31 41	3339	92 8 15	3351	90 45 2	3362
	Regulus W.	86 49 23	3096	88 19 3	3034	89 48 33	3048	91 17 54	3048
	JUPITER W.	82 36 42	2985	84 7 14	2992	85 37 37	2998	87 7 52	3005
	Spica W.	33 21 33	3043	34 50 52	3050	36 20 3	3056	37 49 7	3061
	VENUS E.	62 23 26	3520	61 3 24	3529	59 43 32	3537	58 23 49	3545
	α Aquilæ E.	66 24 56	3525	65 5 0	3545	63 45 26	3566	62 26 15	3588
	SUN E.	83 52 1	3411	82 29 57	3419	81 8 2	3427	79 46 16	3434

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
1	Aldebaran W.	96 7 5	9348	97 51 55	9365	99 36 20	9369	101 20 20	9400
	SATURN W.	86 58 44	9346	88 43 36	9364	90 28 2	9368	92 12 3	9400
	Pollux W.	53 27 59	9484	55 9 34	9486	56 50 53	9506	58 31 55	9522
	Spica E.	37 42 10	9369	35 57 51	9369	34 14 0	9408	32 30 37	9429
	Antares E.	83 30 55	9403	81 47 24	9401	80 4 19	9438	78 21 39	9457
2	Aldebaran W.	109 53 57	9491	111 35 23	9509	113 16 24	9507	114 56 59	9546
	SATURN W.	100 45 44	9491	102 27 10	9509	104 8 11	9507	105 48 46	9546
	Pollux W.	66 52 13	9595	68 31 14	9611	70 9 54	9607	71 48 12	9644
	Regulus W.	30 2 2	9592	31 42 44	9638	33 23 4	9654	35 3 2	9670
	JUPITER W.	25 21 48	9506	27 2 53	9519	28 43 40	9539	30 24 9	9546
	Spica E.	24 1 17	9549	22 21 2	9569	20 41 24	9598	19 2 26	9630
	Antares E.	69 54 57	9553	68 14 58	9573	66 35 26	9593	64 56 22	9613
	SUN E.	136 7 29	9659	134 34 8	9670	133 1 11	9699	131 28 38	9708
3	Pollux W.	79 54 2	9798	81 30 4	9745	83 5 44	9763	84 41 1	9779
	Regulus W.	43 17 15	9654	44 54 57	9671	46 32 16	9687	48 9 13	9704
	JUPITER W.	38 41 29	9693	40 19 53	9638	41 57 56	9654	43 35 37	9670
	Antares E.	56 47 55	9716	55 11 37	9738	53 35 47	9759	52 0 25	9781
	VENUS E.	101 29 39	3091	100 1 18	3110	98 33 21	3139	97 5 47	3149
	α Aquilæ E.	105 54 25	3083	104 25 55	3095	102 57 39	3106	101 29 37	3119
	SUN E.	123 51 52	3099	122 21 42	3091	120 51 55	3040	119 22 32	3068
4	Pollux W.	92 31 54	9863	94 5 0	9880	95 37 45	9895	97 10 10	9912
	Regulus W.	56 8 26	9785	57 43 14	9801	59 17 41	9816	60 51 48	9831
	JUPITER W.	51 38 44	9748	53 14 20	9763	54 49 36	9778	56 24 32	9793
	Antares E.	44 10 43	9691	42 38 13	9615	41 6 13	9639	39 34 43	9662
	VENUS E.	89 53 40	3049	88 28 20	3059	87 3 21	3077	85 38 43	3094
	α Aquilæ E.	94 13 27	3188	92 47 4	3203	91 20 58	3218	89 55 10	3233
	SUN E.	112 1 9	3148	110 33 57	3164	109 7 5	3181	107 40 33	3197
5	Pollux W.	104 47 14	9989	106 17 41	3003	107 47 50	3017	109 17 42	3030
	Regulus W.	68 37 42	9901	70 10 0	9913	71 42 2	9926	73 13 48	9938
	JUPITER W.	64 14 37	9861	65 47 46	9873	67 20 39	9886	68 53 16	9898
	Antares E.	32 5 15	3101	30 37 7	3135	29 9 40	3171	27 42 56	3210
	VENUS E.	78 40 19	3374	77 17 33	3388	75 55 3	3403	74 32 50	3416
	α Aquilæ E.	82 50 45	3319	81 26 48	3329	80 3 10	3345	78 39 51	3363
	SUN E.	100 32 35	3373	99 7 52	3398	97 43 26	3391	96 19 16	3314
6	Regulus W.	80 48 59	9992	82 19 22	3001	83 49 33	3010	85 19 33	3018
	JUPITER W.	76 32 48	9950	78 4 4	9959	79 35 8	9969	81 6 0	9977
	Spica W.	27 23 4	3019	28 52 53	3096	30 22 34	3099	31 52 7	3098
	VENUS E.	67 45 26	3479	66 24 38	3490	65 4 3	3500	63 43 39	3510
	α Aquilæ E.	71 48 12	3450	70 26 52	3469	69 5 52	3487	67 45 13	3506
	SUN E.	89 22 2	3379	87 59 14	3383	86 36 38	3393	85 14 14	3403
7	Regulus W.	92 47 7	3055	94 16 12	3060	95 45 11	3065	97 14 3	3070
	JUPITER W.	88 37 59	3011	90 7 58	3017	91 37 50	3029	93 7 36	3036
	Spica W.	39 18 5	3065	40 46 57	3070	42 15 43	3074	43 44 24	3078
	VENUS E.	57 4 15	3553	55 44 49	3561	54 25 32	3567	53 6 22	3574
	α Aquilæ E.	61 7 28	3610	59 49 5	3633	58 31 6	3657	57 13 33	3682
	SUN E.	78 24 38	3441	77 3 8	3447	75 41 45	3453	74 20 28	3458

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
8	Regulus	W.	98° 42' 49"	3074	100° 11' 30"	3078	101° 40' 6"	3082	103° 8' 38"	3085
	JUPITER	W.	94 37 16	3031	96 6 50	3034	97 36 20	3038	99 5 46	3041
	Spica	W.	45 13 1	3082	46 41 33	3084	48 10 2	3087	49 38 28	3089
	VENUS	E.	51 47 19	3579	50 28 22	3585	49 9 31	3589	47 50 45	3593
	α Aquilæ	E.	55 56 27	3709	54 39 49	3737	53 23 41	3767	52 8 4	3798
	SUN	E.	72 59 17	3462	71 38 11	3467	70 17 10	3471	68 56 13	3474
9	Regulus	W.	110 30 34	3092	111 58 53	3093	113 27 11	3093	114 55 29	3093
	JUPITER	W.	106 32 12	3049	108 1 24	3049	109 30 36	3049	110 59 48	3048
	Spica	W.	57 0 4	3094	58 28 21	3094	59 56 38	3094	61 24 55	3093
	VENUS	E.	41 17 58	3610	39 59 35	3613	38 41 15	3615	37 22 57	3618
	α Aquilæ	E.	45 58 50	3992	44 47 3	4041	43 36 4	4095	42 25 57	4154
	SUN	E.	62 12 12	3482	60 51 28	3483	59 30 45	3483	58 10 2	3482
10	Spica	W.	68 46 48	3082	70 15 19	3079	71 43 54	3078	73 12 33	3072
	Antares	W.	24 31 34	3386	25 53 55	3380	27 16 57	3330	28 40 34	3302
	VENUS	E.	30 52 0	3637	29 33 55	3630	28 15 53	3632	26 57 53	3635
	SUN	E.	51 26 8	3473	50 5 14	3471	48 44 17	3468	47 23 17	3464
11	Spica	W.	80 37 8	3048	82 6 21	3043	83 35 41	3037	85 5 8	3031
	Antares	W.	35 45 39	3200	37 11 48	3183	38 38 17	3168	40 5 4	3154
	SUN	E.	40 37 10	3442	39 15 41	3438	37 54 7	3432	36 32 27	3426
12	Spica	W.	92 34 21	2987	94 4 37	2989	95 35 3	2989	97 5 38	2975
	Antares	W.	47 23 5	3090	48 51 27	3078	50 20 4	3066	51 48 55	3055
	SUN	E.	29 42 30	3399	28 20 12	3393	26 57 48	3388	25 35 18	3383
16	SUN	W.	16 26 27	3145	17 53 42	3194	19 21 23	3105	20 49 27	3087
	α Arietis	E.	51 58 47	2989	50 26 14	2988	48 53 40	2988	47 21 6	2980
	Aldebaran	E.	84 0 56	2711	82 24 31	2703	80 47 55	2694	79 11 7	2685
	SATURN	E.	92 57 2	2719	91 20 48	2711	89 44 23	2702	88 7 46	2694
17	SUN	W.	28 14 28	3019	29 44 17	3008	31 14 20	2996	32 44 38	2985
	α Arietis	E.	39 39 26	2992	38 7 35	2935	36 36 0	2950	35 4 45	2969
	Aldebaran	E.	71 4 13	2643	69 26 16	2634	67 48 7	2626	66 9 47	2617
	SATURN	E.	80 1 51	2652	78 24 6	2643	76 46 10	2635	75 8 2	2627
18	SUN	W.	40 19 29	2934	41 51 5	2923	43 22 54	2914	44 54 55	2904
	Aldebaran	E.	57 55 16	2576	56 15 48	2568	54 36 9	2560	52 56 19	2552
	SATURN	E.	66 54 42	2588	65 15 30	2580	63 36 7	2572	61 56 33	2564
	Pollux	E.	101 14 30	2669	99 37 9	2660	97 59 35	2651	96 21 49	2643
19	SUN	W.	52 38 2	2858	54 11 15	2848	55 44 40	2840	57 18 16	2831
	Aldebaran	E.	44 34 22	2512	42 53 25	2504	41 12 18	2496	39 30 59	2488
	SATURN	E.	53 36 8	2537	51 55 32	2520	50 14 46	2512	48 33 50	2506
	Pollux	E.	88 10 11	2602	86 31 18	2594	84 52 15	2587	83 13 2	2579
20	SUN	W.	65 9 12	2788	66 43 58	2778	68 18 55	2769	69 54 4	2760
	Aldebaran	E.	31 1 39	2449	29 19 14	2441	27 36 38	2434	25 53 52	2426
	SATURN	E.	40 6 48	2472	38 24 56	2467	36 42 56	2460	35 0 47	2455
	Pollux	E.	74 54 29	2545	73 14 19	2540	71 34 1	2534	69 53 35	2528
	Regulus	E.	111 2 49	2457	109 20 35	2449	107 38 10	2441	105 55 34	2433
	JUPITER	E.	113 33 45	2419	111 50 38	2411	110 7 19	2403	108 23 49	2395

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
8	Regulus W.	104° 37' 6"	3087	106° 5' 31"	3089	107° 33' 54"	3091	109° 2' 15"	3093
	JUPITER W.	100 35 8	3043	102 4 27	3045	103 33 44	3047	105 2 59	3049
	Spica W.	51 6 51	3091	52 35 12	3099	54 3 31	3094	55 31 48	3095
	VENUS E.	46 32 3	3598	45 13 26	3601	43 54 53	3605	42 36 24	3608
	α Aquilæ E.	50 53 0	3831	49 38 30	3867	48 24 37	3906	47 11 23	3946
	SUN E.	67 35 20	3477	66 14 30	3479	64 53 42	3480	63 32 56	3489
9	Regulus W.	116 23 47	3099	117 52 6	3091	119 20 27	3089	120 48 50	3087
	JUPITER W.	112 29 1	3047	113 58 15	3047	115 27 30	3045	116 56 47	3043
	Spica W.	62 53 13	3091	64 21 33	3090	65 49 55	3087	67 18 20	3085
	VENUS E.	36 4 42	3690	34 46 29	3691	33 28 17	3693	32 10 7	3695
	α Aquilæ E.	41 16 47	4918	40 8 38	4990	39 1 36	4998	37 55 46	4455
	SUN E.	56 49 18	3481	55 28 33	3480	54 7 47	3479	52 46 59	3476
10	Spica W.	74 41 17	3087	76 10 7	3083	77 39 2	3059	79 8 2	3054
	Antares W.	30 4 43	3978	31 29 20	3956	32 54 23	3926	34 19 50	3917
	VENUS E.	25 39 57	3640	24 22 6	3646	23 4 21	3659	21 46 43	3699
	SUN E.	46 2 13	3460	44 41 4	3456	43 19 51	3459	41 58 33	3447
11	Spica W.	86 34 42	3085	88 4 24	3017	89 34 15	3011	91 4 14	3005
	Antares W.	41 32 8	3140	42 59 29	3197	44 27 6	3114	45 54 58	3109
	SUN E.	35 10 40	3491	33 48 47	3415	32 26 48	3409	31 4 42	3404
12	Spica W.	98 36 22	2968	100 7 16	2969	101 38 20	2951	103 9 34	2949
	Antares W.	53 18 0	3043	54 47 19	3039	56 16 52	3029	57 46 38	3010
	SUN E.	24 12 42	3378	22 50 1	3376	21 27 17	3373	20 4 30	3371
16	SUN W.	22 17 52	3079	23 46 36	3058	25 15 37	3044	26 44 55	3039
	α Arietis E.	45 48 34	2993	44 16 6	2998	42 43 44	2994	41 11 30	2919
	Aldebaran E.	77 34 7	2677	75 56 56	2668	74 19 33	2680	72 41 59	2651
	SATURN E.	86 30 58	2685	84 53 58	2677	83 16 47	2689	81 39 25	2690
17	SUN W.	34 15 10	2974	35 45 55	2993	37 16 54	2954	38 48 5	2943
	α Arietis E.	33 33 54	2993	32 3 33	2992	30 33 48	2957	29 4 46	3100
	Aldebaran E.	64 31 15	2909	62 52 32	2901	61 13 38	2993	59 34 33	2984
	SATURN E.	73 29 44	2619	71 51 15	2611	70 12 35	2603	68 33 44	2595
18	SUN W.	46 27 9	2994	47 59 35	2986	49 32 12	2977	51 5 1	2967
	Aldebaran E.	51 16 18	2544	49 36 6	2536	47 55 43	2537	46 15 8	2530
	SATURN E.	60 16 49	2556	58 36 54	2549	56 56 49	2549	55 16 34	2534
	Pollux E.	94 43 52	2635	93 5 44	2696	91 27 24	2618	89 48 53	2610
19	SUN W.	58 52 4	2991	60 26 4	2913	62 0 15	2904	63 34 38	2795
	Aldebaran E.	37 49 29	2480	36 7 48	2479	34 25 56	2465	32 43 53	2457
	SATURN E.	46 52 45	2499	45 11 30	2499	43 30 5	2485	41 48 31	2479
	Pollux E.	81 33 38	2579	79 54 5	2565	78 14 22	2558	76 34 30	2552
20	SUN W.	71 29 24	2751	73 4 56	2749	74 40 40	2734	76 16 35	2725
	Aldebaran E.	24 10 55	2419	22 27 47	2411	20 44 28	2404	19 0 59	2396
	SATURN E.	33 18 31	2450	31 36 8	2445	29 53 38	2449	28 11 3	2438
	Pollux E.	68 13 1	2599	66 32 19	2517	64 51 30	2513	63 10 35	2509
	Regulus E.	104 12 46	2425	102 29 47	2417	100 46 36	2409	99 3 14	2400
	JUPITER E.	106 40 7	2387	104 56 14	2379	103 12 9	2371	101 27 53	2363

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	Hh.	P. L. of Diff.	Vh.	P. L. of Diff.	Ix.	P. L. of Diff.
21	SUN W.	77° 52' 41"	9716	79° 28' 56"	9708	81° 5' 28"	9700	82° 42' 8"	9691
	α Arietis W.	20 11 10	9411	21 33 14	9355	22 58 18	9199	24 25 52	9096
	Pollux E.	61 29 34	9504	59 48 27	9509	58 7 16	9499	56 26 1	9496
	Regulus E.	97 19 40	9393	95 35 55	9385	93 51 59	9377	92 7 52	9270
	JUPITER E.	99 43 25	9355	97 58 46	9348	96 13 56	9340	94 28 55	9333
22	SUN W.	90 48 18	9850	92 26' 5	9842	94 4 3	9834	95 42 12	9826
	α Arietis W.	32 9 53	9706	33 46 25	9664	35 23 53	9626	37 2 10	9595
	Pollux E.	47 59 12	9495	46 17 52	9499	44 36 37	9303	42 55 28	9509
	Regulus E.	83 24 31	9332	81 39 18	9325	79 53 55	9317	78 8 21	9311
	JUPITER E.	85 41 3	9395	83 54 56	9387	82 8 38	9381	80 22 10	9274
23	SUN W.	103 55 33	9589	105 34 43	9589	107 14 3	9575	108 53 32	9569
	α Arietis W.	45 23 19	9475	47 5 7	9457	48 47 20	9440	50 29 57	9426
	Pollux E.	34 32 51	9577	32 53 24	9609	31 14 31	9633	29 36 21	9671
	Regulus E.	69 17 59	9277	67 31 26	9271	65 44 44	9265	63 57 53	9259
	JUPITER E.	71 27 20	9241	69 39 53	9235	67 52 18	9229	66 4 34	9223
24	SUN W.	117 13 6	9539	118 53 25	9535	120 33 50	9530	122 14 21	9526
	α Arietis W.	59 7 57	9364	60 52 24	9355	62 37 4	9346	64 21 57	9337
	Aldebaran W.	25 8 12	9293	26 56 5	9218	28 44 5	9214	30 32 12	9210
	SATURN W.	16 32 29	9339	18 17 42	9308	20 3 30	9280	21 49 46	9274
	Regulus E.	55 1 37	9294	53 14 0	9230	51 26 17	9226	49 38 29	9223
	JUPITER E.	57 3 55	9199	55 15 26	9196	53 26 52	9192	51 38 13	9189
	Spica E.	108 31 20	9231	106 43 38	9226	104 55 49	9221	103 7 53	9217
25	SUN W.	130 38 20	9509	132 19 21	9507	134 0 24	9506	135 41 29	9505
	α Arietis W.	73 9 0	9306	74 54 50	9303	76 40 45	9300	78 26 44	9298
	Aldebaran W.	39 34 13	9193	41 22 51	9191	43 11 32	9189	45 0 16	9187
	SATURN W.	30 45 24	9291	32 33 6	9225	34 20 56	9221	36 8 52	9217
	Regulus E.	40 38 25	9212	38 50 16	9212	37 2 7	9212	35 13 58	9214
	JUPITER E.	42 34 0	9180	40 45 3	9180	38 56 6	9179	37 7 11	9183
	Spica E.	94 6 47	9200	92 18 20	9198	90 29 50	9197	88 41 18	9196
26	α Arietis W.	87 17 25	9293	89 3 35	9293	90 49 44	9296	92 35 50	9298
	Aldebaran W.	54 4 17	9187	55 53 4	9188	57 41 49	9190	59 30 32	9192
	SATURN W.	45 9 34	9210	46 57 47	9210	48 46 0	9210	50 34 12	9212
	Spica E.	79 38 18	9195	77 49 43	9196	76 1 10	9198	74 12 40	9200
	Antares E.	124 58 9	9269	123 11 24	9267	121 24 36	9266	119 37 46	9265
27	α Arietis W.	101 25 5	9321	103 10 34	9328	104 55 53	9335	106 41 2	9343
	Aldebaran W.	68 33 6	9210	70 21 19	9214	72 9 25	9220	73 57 23	9226
	SATURN W.	59 34 23	9228	61 22 9	9232	63 9 49	9237	64 57 21	9243
	Pollux W.	27 24 52	9649	29 2 41	9606	30 41 28	9572	32 21 1	9545
	Spica E.	65 11 16	9290	63 23 18	9225	61 35 28	9231	59 47 46	9237
	Antares E.	110 43 44	9273	108 57 5	9276	107 10 31	9281	105 24 4	9286
28	Aldebaran W.	82 54 44	9263	84 41 38	9272	86 28 19	9281	88 14 46	9291
	SATURN W.	73 52 39	9279	75 39 9	9286	77 25 26	9298	79 11 29	9307
	Pollux W.	40 46 1	9474	42 27 51	9469	44 9 48	9467	45 51 48	9466
	Spica E.	50 51 57	9277	49 5 24	9287	47 19 6	9297	45 33 2	9308
	Antares E.	96 33 54	9319	94 48 23	9326	93 3 5	9337	91 18 0	9347

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
21	SUN W.	84 19 0	9683	85 56 3	9675	87 33 17	9666	89 10 42	9658
	α Arietis W.	25 55 32	9640	27 27 0	9667	29 0 1	9606	30 34 22	9759
	Pollux E.	54 44 42	9494	53 3 21	9493	51 21 58	9483	49 40 35	9483
	Regulus E.	90 23 34	9369	88 39 5	9354	86 54 24	9347	85 9 33	9339
	JUPITER E.	92 43 43	9395	90 58 20	9317	89 12 45	9309	87 26 59	9302
22	SUN W.	97 20 32	9618	98 59 2	9611	100 37 42	9604	102 16 32	9595
	α Arietis W.	38 41 11	9566	40 20 52	9540	42 1 9	9517	43 41 59	9495
	Pollux E.	41 14 27	9517	39 33 38	9597	37 53 3	9540	36 12 46	9556
	Regulus E.	76 22 37	9304	74 36 43	9296	72 50 38	9289	71 4 23	9283
	JUPITER E.	78 35 32	9267	76 48 44	9260	75 1 46	9254	73 14 38	9247
23	SUN W.	110 33 10	9569	112 12 57	9556	113 52 52	9551	115 32 55	9545
	α Arietis W.	52 12 55	9419	53 56 13	9396	55 39 50	9386	57 23 45	9374
	Pollux E.	27 59 2	9717	26 22 45	9775	24 47 45	9648	23 14 20	9641
	Regulus E.	62 10 53	9253	60 23 45	9249	58 36 30	9243	56 49 7	9239
	JUPITER E.	64 16 41	9218	62 28 40	9213	60 40 32	9208	58 52 17	9204
24	SUN W.	123 54 58	9592	125 35 41	9517	127 16 30	9514	128 57 23	9513
	α Arietis W.	66 7 2	9330	67 52 18	9394	69 37 43	9317	71 23 17	9311
	Aldebaran W.	32 20 25	9206	34 8 44	9202	35 57 9	9198	37 45 39	9196
	SATURN W.	23 36 24	9269	25 23 19	9259	27 10 29	9244	28 57 51	9237
	Regulus E.	47 50 36	9220	46 2 39	9218	44 14 38	9215	42 26 33	9213
	JUPITER E.	49 49 29	9186	48 0 41	9184	46 11 50	9181	44 22 56	9181
	Spica E.	101 19 51	9218	99 31 43	9209	97 43 29	9206	95 55 10	9203
25	SUN W.	137 22 36	9504	139 3 44	9504	140 44 52	9504	142 26 0	9505
	α Arietis W.	80 12 47	9295	81 58 54	9293	83 45 3	9292	85 31 14	9292
	Aldebaran W.	46 49 3	9186	48 37 51	9186	50 26 40	9186	52 15 29	9186
	SATURN W.	37 56 54	9214	39 45 0	9212	41 33 9	9210	43 21 21	9210
	Regulus E.	33 25 51	9216	31 37 47	9218	29 49 46	9221	28 1 50	9226
	JUPITER E.	35 18 18	9185	33 29 28	9183	31 40 43	9193	29 52 5	9199
	Spica E.	86 52 44	9194	85 4 8	9194	83 15 31	9194	81 26 54	9194
26	α Arietis W.	94 21 52	9201	96 7 50	9205	97 53 42	9210	99 39 27	9215
	Aldebaran W.	61 19 12	9194	63 7 48	9197	64 56 20	9201	66 44 46	9205
	SATURN W.	52 22 22	9214	54 10 29	9216	55 58 32	9220	57 46 30	9223
	Spica E.	72 24 13	9204	70 35 51	9206	68 47 33	9210	66 59 21	9215
	Antares E.	117 50 55	9205	116 4 4	9206	114 17 15	9208	112 30 28	9270
27	α Arietis W.	108 25 59	9252	110 10 43	9269	111 55 13	9273	113 39 27	9284
	Aldebaran W.	75 45 12	9233	77 32 51	9239	79 20 20	9247	81 7 38	9255
	SATURN W.	66 44 45	9249	68 32 0	9256	70 19 4	9264	72 5 57	9271
	Pollux W.	34 1 12	9293	35 41 53	9306	37 22 58	9492	39 4 22	9489
	Spica E.	58 0 14	9245	56 12 53	9252	54 25 43	9260	52 38 44	9268
	Antares E.	103 37 44	9291	101 51 32	9298	100 5 29	9304	98 19 36	9319
28	Aldebaran W.	90 0 59	9301	91 46 57	9311	93 32 40	9323	95 18 6	9334
	SATURN W.	80 57 18	9317	82 42 52	9328	84 28 11	9339	86 13 14	9350
	Pollux W.	47 33 49	9466	49 15 50	9468	50 57 48	9471	52 39 42	9476
	Spica E.	43 47 14	9319	42 1 42	9331	40 16 28	9344	38 31 33	9357
	Antares E.	89 33 9	9357	87 48 32	9369	86 4 11	9380	84 20 7	9391

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
<i>SUN.</i>	1	<sup>h</sup> 22 <sup>m</sup> 50 <sup>s</sup> 18.93	9.348	S. 7° 24' 0.9"	+57.07	16' 10.31"	65.40	<sup>m</sup> 12 <sup>s</sup> 27.84	0.508
Mon.	2	22 54 3.02	9.328	7 1 7.9	57.33	16 10.07	65.33	12 15.42	0.528
Tues.	3	22 57 46.63	9.308	6 38 9.0	57.57	16 9.82	65.26	12 2.52	0.548
Wed.	4	23 1 29.78	9.290	6 15 4.6	+57.80	16 9.56	65.19	11 49.16	0.566
Thur.	5	23 5 12.50	9.272	5 51 55.0	58.01	16 9.30	65.13	11 35.36	0.584
Frid.	6	23 8 54.81	9.254	5 28 40.5	58.20	16 9.04	65.07	11 21.16	0.601
Sat.	7	23 12 36.72	9.238	5 5 21.5	+58.38	16 8.78	65.01	11 6.56	0.617
<i>SUN.</i>	8	23 16 18.26	9.223	4 41 58.4	58.54	16 8.52	64.95	10 51.59	0.632
Mon.	9	23 19 59.46	9.209	4 18 31.6	58.68	16 8.25	64.90	10 36.27	0.646
Tues.	10	23 23 40.35	9.196	3 55 1.6	+58.81	16 7.98	64.85	10 20.63	0.659
Wed.	11	23 27 20.91	9.184	3 31 28.7	58.93	16 7.71	64.81	10 4.69	0.671
Thur.	12	23 31 1.18	9.172	3 7 53.2	59.03	16 7.44	64.76	9 48.45	0.683
Frid.	13	23 34 41.17	9.161	2 44 15.5	+59.11	16 7.17	64.72	9 31.93	0.694
Sat.	14	23 38 20.90	9.151	2 20 36.0	59.18	16 6.90	64.68	9 15.15	0.704
<i>SUN.</i>	15	23 42 0.41	9.141	1 56 55.2	59.23	16 6.63	64.64	8 58.15	0.714
Mon.	16	23 45 39.69	9.132	1 33 13.3	+59.26	16 6.36	64.61	8 40.93	0.723
Tues.	17	23 49 18.75	9.124	1 9 30.9	59.27	16 6.09	64.58	8 23.50	0.731
Wed.	18	23 52 57.63	9.116	0 45 48.3	59.27	16 5.82	64.55	8 5.87	0.739
Thur.	19	23 56 36.34	9.109	S. 0 22 5.8	+59.26	16 5.55	64.53	7 48.07	0.746
Frid.	20	0 0 14.88	9.103	N. 0 1 36.2	59.23	16 5.28	64.51	7 30.10	0.752
Sat.	21	0 3 53.28	9.098	0 25 17.2	59.19	16 5.01	64.50	7 12.01	0.757
<i>SUN.</i>	22	0 7 31.58	9.094	0 48 57.0	+59.13	16 4.74	64.49	6 53.80	0.761
Mon.	23	0 11 9.78	9.090	1 12 35.1	59.06	16 4.47	64.48	6 35.50	0.765
Tues.	24	0 14 47.89	9.087	1 36 11.3	58.97	16 4.20	64.47	6 17.12	0.768
Wed.	25	0 18 25.94	9.084	1 59 45.1	+58.86	16 3.93	64.47	5 58.67	0.771
Thur.	26	0 22 3.95	9.083	2 23 16.2	58.73	16 3.66	64.47	5 40.17	0.772
Frid.	27	0 25 41.94	9.083	2 46 44.3	58.60	16 3.39	64.47	5 21.66	0.772
Sat.	28	0 29 19.94	9.084	3 10 9.0	+58.45	16 3.12	64.47	5 3.16	0.771
<i>SUN.</i>	29	0 32 57.97	9.085	3 33 30.0	58.29	16 2.84	64.48	4 44.69	0.770
Mon.	30	0 36 36.05	9.088	3 56 46.9	58.12	16 2.56	64.49	4 26.27	0.767
Tues.	31	0 40 14.21	9.092	4 19 59.5	57.93	16 2.28	64.50	4 7.93	0.763
Wed.	32	0 43 52.48	9.097	N. 4 43 7.4	+57.73	16 2.00	64.51	3 49.70	0.758

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sideral time.  
 The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing;  
 north declinations, increasing.



AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
SUN.	1	<sup>h</sup> 22 <sup>m</sup> 50 <sup>s</sup> 16.98	9.349	S. <sup>°</sup> 7 <sup>'</sup> 24 <sup>"</sup> 12.8	+57.08	<sup>m</sup> 12 <sup>s</sup> 27.94	0.508	<sup>h</sup> 22 <sup>m</sup> 37 <sup>s</sup> 49.04
Mon.	2	22 54 1.11	9.329	7 1 19.7	57.34	12 15.52	0.528	22 41 45.59
Tues.	3	22 57 44.76	9.309	6 38 20.6	57.58	12 2.62	0.548	22 45 42.14
Wed.	4	23 1 27.95	9.291	6 15 16.0	+57.81	11 49.26	0.566	22 49 38.69
Thur.	5	23 5 10.71	9.273	5 52 6.2	58.02	11 35.47	0.584	22 53 35.24
Frid.	6	23 8 53.06	9.256	5 28 51.5	58.21	11 21.27	0.601	22 57 31.79
Sat.	7	23 12 35.01	9.240	5 5 32.3	+58.39	11 6.67	0.617	23 1 28.35
SUN.	8	23 16 16.59	9.225	4 42 9.0	58.55	10 51.69	0.632	23 5 24.90
Mon.	9	23 19 57.83	9.211	4 18 42.0	58.69	10 36.38	0.646	23 9 21.45
Tues.	10	23 23 38.74	9.198	3 55 11.8	+58.82	10 20.74	0.659	23 13 18.00
Wed.	11	23 27 19.36	9.186	3 31 38.6	58.94	10 4.80	0.671	23 17 14.56
Thur.	12	23 30 59.67	9.174	3 8 2.8	59.04	9 48.56	0.683	23 21 11.11
Frid.	13	23 34 39.71	9.163	2 44 24.9	+59.12	9 32.04	0.694	23 25 7.67
Sat.	14	23 38 19.48	9.153	2 20 45.2	59.19	9 15.26	0.704	23 29 4.22
SUN.	15	23 41 59.03	9.143	1 57 4.1	59.24	8 58.26	0.714	23 33 0.77
Mon.	16	23 45 38.36	9.134	1 33 21.9	+59.27	8 41.04	0.723	23 36 57.32
Tues.	17	23 49 17.47	9.126	1 9 39.2	59.28	8 23.60	0.731	23 40 53.87
Wed.	18	23 52 56.39	9.118	0 45 56.3	59.28	8 5.97	0.739	23 44 50.42
Thur.	19	23 56 35.14	9.111	S. 0 22 13.5	+59.27	7 48.17	0.746	23 48 46.97
Frid.	20	0 0 13.73	9.105	N. 0 1 28.8	59.24	7 30.20	0.752	23 52 43.53
Sat.	21	0 3 52.19	9.100	0 25 10.1	59.20	7 12.10	0.757	23 56 40.08
SUN.	22	0 7 30.52	9.096	0 48 50.2	+59.14	6 53.89	0.761	0 0 36.63
Mon.	23	0 11 8.76	9.092	1 12 28.6	59.07	6 35.58	0.765	0 4 33.18
Tues.	24	0 14 46.93	9.089	1 36 5.1	58.98	6 17.20	0.768	0 8 29.73
Wed.	25	0 18 25.03	9.086	1 59 39.3	+58.87	5 58.75	0.771	0 12 26.28
Thur.	26	0 22 3.08	9.085	2 23 10.7	58.74	5 40.25	0.772	0 16 22.83
Frid.	27	0 25 41.12	9.085	2 46 39.1	58.61	5 21.73	0.772	0 20 19.39
Sat.	28	0 29 19.18	9.086	3 10 4.1	+58.46	5 3.23	0.771	0 24 15.95
SUN.	29	0 32 57.26	9.087	3 33 25.4	58.30	4 44.76	0.770	0 28 12.50
Mon.	30	0 36 35.38	9.090	3 56 42.6	58.12	4 26.33	0.767	0 32 9.05
Tues.	31	0 40 13.58	9.094	4 19 55.5	57.94	4 7.99	0.763	0 36 5.59
Wed.	32	0 43 51.90	9.099	N. 4 43 3.7	+57.74	3 49.75	0.758	0 40 2.15

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations, increasing.

Diff. for 1 Hour,  
+ 9'.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	60	341° 6' 51.4	6' 40.5	150.32	— 0.41	9.9962645	+ 45.7	<sup>h</sup> 1 <sup>m</sup> 21 <sup>s</sup> 57.50
2	61	342 6 58.2	6 47.2	150.24	0.28	9.9963750	46.4	1 18 1.59
3	62	343 7 3.3	6 52.2	150.17	0.15	9.9964871	47.1	1 14 5.68
4	63	344 7 6.6	6 55.4	150.10	— 0.01	9.9966009	+ 47.7	1 10 9.78
5	64	345 7 8.3	6 57.0	150.03	+ 0.12	9.9967161	48.3	1 6 13.87
6	65	346 7 8.3	6 57.0	149.96	0.23	9.9968325	48.8	1 2 17.96
7	66	347 7 6.7	6 55.3	149.90	+ 0.33	9.9969501	+ 49.2	0 58 22.05
8	67	348 7 3.4	6 51.9	149.83	0.40	9.9970687	49.6	0 54 26.15
9	68	349 6 58.5	6 46.9	149.76	0.44	9.9971883	50.0	0 50 30.25
10	69	350 6 51.9	6 40.2	149.69	+ 0.45	9.9973085	+ 50.2	0 46 34.34
11	70	351 6 43.5	6 31.8	149.62	0.44	9.9974294	50.4	0 42 38.43
12	71	352 6 33.5	6 21.7	149.55	0.40	9.9975506	50.5	0 38 42.52
13	72	353 6 21.8	6 9.9	149.48	+ 0.32	9.9976720	+ 50.6	0 34 46.62
14	73	354 6 8.3	5 56.3	149.40	0.22	9.9977936	50.6	0 30 50.71
15	74	355 5 52.9	5 40.8	149.32	+ 0.10	9.9979152	50.6	0 26 54.80
16	75	356 5 35.5	5 23.4	149.24	— 0.02	9.9980367	+ 50.6	0 22 58.90
17	76	357 5 16.1	5 3.9	149.15	0.15	9.9981581	50.6	0 19 3.00
18	77	358 4 54.6	4 42.2	149.06	0.28	9.9982795	50.6	0 15 7.09
19	78	359 4 30.8	4 18.4	148.97	— 0.39	9.9984008	+ 50.6	0 11 11.18
20	79	0 4 4.8	3 52.4	148.88	0.48	9.9985220	50.6	0 7 15.27
21	80	1 3 36.7	3 24.2	148.78	0.57	9.9986433	50.5	{ 0 3 19.37 23 59 23.46 }
22	81	2 3 6.3	2 53.7	148.68	— 0.63	9.9987646	+ 50.6	23 55 27.55
23	82	3 2 33.5	2 20.8	148.58	0.65	9.9988861	50.7	23 51 31.65
24	83	4 1 58.3	1 45.5	148.48	0.63	9.9990076	50.8	23 47 35.75
25	84	5 1 20.9	1 8.0	148.39	— 0.59	9.9991297	+ 50.9	23 43 39.84
26	85	6 0 41.1	0 28.2	148.29	0.51	9.9992521	51.1	23 39 43.93
27	86	6 59 59.0	59 46.0	148.20	0.41	9.9993751	51.3	23 35 48.03
28	87	7 59 14.7	59 1.6	148.11	— 0.30	9.9994987	+ 51.5	23 31 52.12
29	88	8 58 28.1	58 14.9	148.02	0.18	9.9996228	51.8	23 27 56.21
30	89	9 57 39.4	57 26.1	147.93	— 0.05	9.9997475	52.0	23 24 0.30
31	90	10 56 48.7	56 35.4	147.84	+ 0.09	9.9998728	52.3	23 20 4.40
32	91	11 55 56.0	55 42.6	147.76	+ 0.22	9.9999987	+ 52.5	23 16 8.50
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> .0.								Diff. for 1 Hour, — 9 <sup>s</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
1	16' 1.9	15' 56.5	58' 43.3	- 1.57	58' 23.5	- 1.73	<sup>h</sup> 12 <sup>m</sup> 52.2	<sup>m</sup> 2.10	<sup>d</sup> 14.4	
2	15 50.7	15 44.5	58 2.3	1.82	57 39.7	1.89	13 41.8	2.04	15.4	
3	15 38.2	15 31.9	57 16.5	1.93	56 53.2	1.91	14 30.2	2.00	16.4	
4	15 25.7	15 19.7	56 30.4	- 1.86	56 8.4	- 1.79	15 17.8	1.97	17.4	
5	15 14.0	15 8.7	55 47.4	1.69	55 27.9	1.54	16 5.1	1.97	18.4	
6	15 3.8	14 59.6	55 10.1	1.40	54 54.5	1.20	16 52.3	1.96	19.4	
7	14 55.9	14 52.9	54 41.1	- 1.03	54 30.1	- 0.81	17 39.6	1.97	20.4	
8	14 50.6	14 49.0	54 21.7	0.59	54 15.9	- 0.37	18 26.9	1.97	21.4	
9	14 48.2	14 48.0	54 12.7	- 0.16	54 12.2	+ 0.07	19 14.2	1.97	22.4	
10	14 48.6	14 49.9	54 14.3	+ 0.27	54 18.9	+ 0.48	20 1.4	1.96	23.4	
11	14 51.7	14 54.2	54 25.8	0.67	54 35.0	0.85	20 48.5	1.96	24.4	
12	14 57.3	15 0.9	54 46.2	1.01	54 59.3	1.17	21 35.4	1.95	25.4	
13	15 4.8	15 9.2	55 13.9	+ 1.27	55 29.8	+ 1.36	22 22.1	1.95	26.4	
14	15 13.8	15 18.6	55 46.7	1.44	56 4.4	1.49	23 9.0	1.96	27.4	
15	15 23.5	15 28.4	56 22.5	1.51	56 40.6	1.51	23 56.4	1.99	28.4	
16	15 33.3	15 38.1	56 58.5	+ 1.47	57 16.0	+ 1.42	<sup>d</sup> 0		29.4	
17	15 42.6	15 46.9	57 32.7	1.35	57 48.4	1.26	0 44.8	2.04	0.8	
18	15 50.9	15 54.5	58 3.0	1.16	58 16.3	1.05	1 34.5	2.11	1.8	
19	15 57.7	16 0.6	58 28.2	+ 0.93	58 38.8	+ 0.82	2 26.0	2.19	2.8	
20	16 3.1	16 5.2	58 47.9	0.70	58 55.6	0.58	3 19.6	2.28	3.8	
21	16 6.9	16 8.3	59 2.0	0.48	59 7.1	0.37	4 15.1	2.35	4.8	
22	16 9.4	16 10.1	59 10.9	+ 0.27	59 13.5	+ 0.17	5 12.2	2.40	5.8	
23	16 10.5	16 10.5	59 14.9	+ 0.07	59 15.2	- 0.02	6 10.1	2.41	6.8	
24	16 10.3	16 9.7	59 14.3	- 0.12	59 12.3	0.22	7 7.6	2.38	7.8	
25	16 8.9	16 7.6	59 9.0	- 0.33	59 4.4	- 0.44	8 4.0	2.31	8.8	
26	16 6.0	16 3.9	58 58.4	0.56	58 51.0	0.67	8 58.5	2.23	9.8	
27	16 1.5	15 58.7	58 42.1	0.80	58 31.7	0.92	9 51.2	2.15	10.8	
28	15 55.5	15 51.9	58 19.9	- 1.05	58 6.7	- 1.16	10 42.1	2.09	11.8	
29	15 47.9	15 43.6	57 52.1	1.27	57 36.3	1.36	11 31.6	2.04	12.8	
30	15 39.0	15 34.2	57 19.5	1.43	57 1.9	1.48	12 20.1	2.01	13.8	
31	15 29.3	15 24.3	56 43.8	1.52	56 25.5	1.52	13 8.1	1.99	14.8	
32	15 19.4	15 14.5	56 7.3	- 1.50	55 49.5	- 1.46	13 55.9	1.99	15.8	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 1.					TUESDAY 3.				
0	<sup>h</sup> 11 <sup>m</sup> 3 42.46	2.2285	N. 4° 8' 32.7"	10.090	0	<sup>h</sup> 12 <sup>m</sup> 47 43.48	2.1172	S. 4° 20' 2.7"	10.117
1	11 5 56.08	2.2255	3 57 50.9	10.702	1	12 49 50.46	2.1156	4 30 8.7	10.082
2	11 8 9.52	2.2225	3 47 8.4	10.714	2	12 51 57.35	2.1140	4 40 12.6	10.047
3	11 10 22.78	2.2195	3 36 25.2	10.725	3	12 54 4.14	2.1124	4 50 14.3	10.010
4	11 12 35.86	2.2166	3 25 41.4	10.735	4	12 56 10.84	2.1110	5 0 13.8	9.973
5	11 14 48.77	2.2137	3 14 57.0	10.743	5	12 58 17.46	2.1096	5 10 11.1	9.936
6	11 17 1.51	2.2108	3 4 12.2	10.750	6	13 0 24.00	2.1082	5 20 6.1	9.897
7	11 19 14.07	2.2080	2 53 27.0	10.756	7	13 2 30.45	2.1068	5 29 58.7	9.857
8	11 21 26.47	2.2052	2 42 41.5	10.761	8	13 4 36.82	2.1054	5 39 48.9	9.817
9	11 23 38.70	2.2024	2 31 55.7	10.765	9	13 6 43.10	2.1041	5 49 36.8	9.777
10	11 25 50.76	2.1997	2 21 9.7	10.767	10	13 8 49.31	2.1028	5 59 22.2	9.735
11	11 28 2.66	2.1970	2 10 23.6	10.769	11	13 10 55.44	2.1015	6 9 5.0	9.693
12	11 30 14.40	2.1943	1 59 37.4	10.770	12	13 13 1.49	2.1003	6 18 45.3	9.650
13	11 32 25.97	2.1915	1 48 51.2	10.769	13	13 15 7.47	2.0991	6 28 23.0	9.608
14	11 34 37.38	2.1889	1 38 5.1	10.767	14	13 17 13.38	2.0978	6 37 58.0	9.561
15	11 36 48.64	2.1863	1 27 19.2	10.764	15	13 19 19.21	2.0967	6 47 30.3	9.516
16	11 38 59.74	2.1837	1 16 33.4	10.761	16	13 21 24.98	2.0956	6 56 59.9	9.471
17	11 41 10.69	2.1812	1 5 47.9	10.756	17	13 23 30.68	2.0945	7 6 26.8	9.425
18	11 43 21.48	2.1786	0 55 2.7	10.750	18	13 25 36.32	2.0935	7 15 50.9	9.377
19	11 45 32.12	2.1761	0 44 17.9	10.742	19	13 27 41.90	2.0924	7 25 12.1	9.329
20	11 47 42.61	2.1737	0 33 33.6	10.734	20	13 29 47.41	2.0913	7 34 30.4	9.281
21	11 49 52.96	2.1712	0 22 49.8	10.725	21	13 31 52.86	2.0903	7 43 45.8	9.232
22	11 52 3.16	2.1688	0 12 6.6	10.715	22	13 33 58.25	2.0893	7 52 58.3	9.189
23	11 54 13.22	2.1665	N. 0 1 24.0	10.704	23	13 36 3.58	2.0884	S. 8 2 7.7	9.139
MONDAY 2.					WEDNESDAY 4.				
0	11 56 23.14	2.1642	S. 0 9 17.9	10.692	0	13 38 8.86	2.0876	S. 8 11 14.1	9.082
1	11 58 32.92	2.1618	0 19 59.0	10.678	1	13 40 14.09	2.0867	8 20 17.5	9.030
2	12 0 42.56	2.1595	0 30 39.3	10.664	2	13 42 19.26	2.0858	8 29 17.7	8.977
3	12 2 52.06	2.1573	0 41 18.7	10.648	3	13 44 24.38	2.0849	8 38 14.8	8.925
4	12 5 1.43	2.1551	0 51 57.1	10.632	4	13 46 29.45	2.0841	8 47 8.7	8.872
5	12 7 10.67	2.1528	1 2 34.6	10.616	5	13 48 34.47	2.0833	8 55 59.4	8.818
6	12 9 19.77	2.1507	1 13 11.0	10.597	6	13 50 39.45	2.0826	9 4 46.9	8.764
7	12 11 28.75	2.1486	1 23 46.3	10.578	7	13 52 44.38	2.0818	9 13 31.1	8.709
8	12 13 37.60	2.1464	1 34 20.4	10.558	8	13 54 49.27	2.0811	9 22 12.0	8.653
9	12 15 46.32	2.1443	1 44 53.3	10.537	9	13 56 54.11	2.0804	9 30 49.5	8.597
10	12 17 54.92	2.1423	1 55 24.9	10.516	10	13 58 58.91	2.0797	9 39 23.6	8.540
11	12 20 3.40	2.1403	2 5 55.2	10.493	11	14 1 3.67	2.0791	9 47 54.3	8.483
12	12 22 11.76	2.1384	2 16 24.1	10.469	12	14 3 8.40	2.0785	9 56 21.6	8.426
13	12 24 20.01	2.1365	2 26 51.5	10.444	13	14 5 13.09	2.0778	10 4 45.4	8.368
14	12 26 28.14	2.1345	2 37 17.4	10.419	14	14 7 17.74	2.0772	10 13 5.7	8.309
15	12 28 36.15	2.1326	2 47 41.8	10.393	15	14 9 22.36	2.0767	10 21 22.5	8.250
16	12 30 44.05	2.1308	2 58 4.6	10.366	16	14 11 26.95	2.0762	10 29 35.7	8.190
17	12 32 51.84	2.1290	3 8 25.7	10.337	17	14 13 31.50	2.0756	10 37 45.3	8.130
18	12 34 59.53	2.1272	3 18 45.1	10.308	18	14 15 36.02	2.0751	10 45 51.3	8.069
19	12 37 7.11	2.1255	3 29 2.7	10.278	19	14 17 40.51	2.0747	10 53 53.6	8.007
20	12 39 14.59	2.1237	3 39 18.5	10.248	20	14 19 44.98	2.0742	11 1 52.2	7.946
21	12 41 21.96	2.1220	3 49 32.5	10.217	21	14 21 49.42	2.0737	11 9 47.1	7.884
22	12 43 29.23	2.1203	3 59 44.6	10.185	22	14 23 53.83	2.0733	11 17 38.3	7.822
23	12 45 36.40	2.1187	4 9 54.7	10.151	23	14 25 58.22	2.0730	11 25 25.8	7.760
24	12 47 43.48	2.1172	S. 4 20 2.7	10.117	24	14 28 2.59	2.0727	S. 11 33 9.5	7.698

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 5.					SATURDAY 7.				
0	14 <sup>h</sup> 28 <sup>m</sup> 2.59 <sup>s</sup>	2.0797	S. 11° 33' 9.5"	7.696	0	16 <sup>h</sup> 7 <sup>m</sup> 21.96 <sup>s</sup>	2.0899	S. 16° 22' 17.5"	4.939
1	14 30 6.94	2.0793	11 40 49.3	7.639	1	16 9 26.16	2.0700	16 26 29.1	4.154
2	14 32 11.26	2.0719	11 48 25.3	7.568	2	16 11 30.36	2.0701	16 30 36.0	4.075
3	14 34 15.56	2.0715	11 55 57.4	7.503	3	16 13 34.57	2.0709	16 34 38.1	3.996
4	14 36 19.84	2.0712	12 3 25.6	7.438	4	16 15 38.79	2.0704	16 38 35.5	3.917
5	14 38 24.10	2.0709	12 10 49.9	7.372	5	16 17 43.02	2.0705	16 42 28.1	3.837
6	14 40 28.35	2.0707	12 18 10.2	7.305	6	16 19 47.25	2.0706	16 46 15.9	3.757
7	14 42 32.58	2.0704	12 25 26.5	7.238	7	16 21 51.49	2.0708	16 49 58.9	3.677
8	14 44 36.80	2.0702	12 32 38.8	7.179	8	16 23 55.74	2.0710	16 53 37.1	3.597
9	14 46 41.00	2.0699	12 39 47.1	7.105	9	16 26 0.01	2.0712	16 57 10.6	3.517
10	14 48 45.19	2.0697	12 46 51.4	7.038	10	16 28 4.28	2.0713	17 0 39.2	3.437
11	14 50 49.37	2.0696	12 53 51.7	6.971	11	16 30 8.56	2.0713	17 4 3.0	3.356
12	14 52 53.54	2.0694	13 0 47.9	6.902	12	16 32 12.84	2.0714	17 7 21.9	3.275
13	14 54 57.70	2.0692	13 7 39.9	6.839	13	16 34 17.13	2.0716	17 10 36.0	3.194
14	14 57 1.85	2.0691	13 14 27.8	6.763	14	16 36 21.43	2.0717	17 13 45.2	3.113
15	14 59 5.99	2.0689	13 21 11.5	6.694	15	16 38 25.74	2.0719	17 16 49.6	3.033
16	15 1 10.12	2.0688	13 27 51.1	6.624	16	16 40 30.06	2.0721	17 19 49.1	2.951
17	15 3 14.24	2.0687	13 34 26.4	6.553	17	16 42 34.39	2.0722	17 22 43.7	2.870
18	15 5 18.36	2.0686	13 40 57.5	6.483	18	16 44 38.72	2.0723	17 25 33.5	2.789
19	15 7 22.47	2.0685	13 47 24.4	6.419	19	16 46 43.06	2.0724	17 28 18.4	2.707
20	15 9 26.58	2.0684	13 53 47.0	6.341	20	16 48 47.41	2.0726	17 30 58.4	2.625
21	15 11 30.68	2.0683	14 0 5.3	6.269	21	16 50 51.77	2.0727	17 33 33.4	2.543
22	15 13 34.78	2.0683	14 6 19.3	6.198	22	16 52 56.13	2.0728	17 36 3.5	2.461
23	15 15 38.88	2.0682	S. 14 12 29.0	6.126	23	16 55 0.50	2.0729	S. 17 38 28.7	2.379
FRIDAY 6.					SUNDAY 8.				
0	15 17 42.97	2.0682	S. 14 18 34.4	6.053	0	16 57 4.88	2.0730	S. 17 40 49.0	2.297
1	15 19 47.07	2.0682	14 24 35.4	5.980	1	16 59 9.26	2.0731	17 43 4.3	2.214
2	15 21 51.16	2.0682	14 30 32.0	5.908	2	17 1 13.65	2.0732	17 45 14.7	2.132
3	15 23 55.25	2.0682	14 36 24.3	5.835	3	17 3 18.05	2.0733	17 47 20.2	2.050
4	15 25 59.34	2.0682	14 42 12.2	5.761	4	17 5 22.45	2.0734	17 49 20.7	1.967
5	15 28 3.43	2.0683	14 47 55.6	5.686	5	17 7 26.86	2.0735	17 51 16.3	1.885
6	15 30 7.53	2.0683	14 53 34.5	5.612	6	17 9 31.27	2.0736	17 53 6.9	1.802
7	15 32 11.63	2.0683	14 59 9.0	5.537	7	17 11 35.69	2.0737	17 54 52.5	1.718
8	15 34 15.73	2.0683	15 4 39.0	5.462	8	17 13 40.11	2.0737	17 56 33.1	1.636
9	15 36 19.83	2.0683	15 10 4.5	5.387	9	17 15 44.54	2.0738	17 58 8.8	1.553
10	15 38 23.93	2.0684	15 15 25.5	5.312	10	17 17 48.97	2.0738	17 59 39.5	1.470
11	15 40 28.04	2.0685	15 20 42.0	5.237	11	17 19 53.40	2.0739	18 1 5.2	1.387
12	15 42 32.15	2.0686	15 25 53.9	5.161	12	17 21 57.84	2.0740	18 2 25.9	1.303
13	15 44 36.27	2.0687	15 31 1.3	5.085	13	17 24 2.28	2.0740	18 3 41.6	1.220
14	15 46 40.39	2.0687	15 36 4.1	5.008	14	17 26 6.72	2.0741	18 4 52.3	1.138
15	15 48 44.52	2.0688	15 41 2.3	4.932	15	17 28 11.17	2.0742	18 5 58.1	1.055
16	15 50 48.65	2.0689	15 45 55.9	4.855	16	17 30 15.62	2.0742	18 6 58.9	0.971
17	15 52 52.79	2.0691	15 50 44.9	4.778	17	17 32 20.07	2.0742	18 7 54.6	0.887
18	15 54 56.94	2.0692	15 55 29.3	4.701	18	17 34 24.52	2.0742	18 8 45.3	0.803
19	15 57 1.09	2.0693	16 0 9.0	4.623	19	17 36 28.97	2.0742	18 9 31.0	0.720
20	15 59 5.25	2.0694	16 4 44.1	4.546	20	17 38 33.42	2.0743	18 10 11.7	0.637
21	16 1 9.42	2.0695	16 9 14.5	4.468	21	17 40 37.88	2.0743	18 10 47.4	0.553
22	16 3 13.59	2.0696	16 13 40.2	4.389	22	17 42 42.34	2.0743	18 11 18.1	0.470
23	16 5 17.77	2.0696	16 18 1.2	4.311	23	17 44 46.79	2.0742	18 11 43.8	0.387
24	16 7 21.96	2.0699	S. 16 22 17.5	4.232	24	17 46 51.24	2.0742	S. 18 12 4.5	0.303

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 9.					WEDNESDAY 11.				
0	17 46 51.24	2.0742	S. 18° 12' 4.5"	0.303	0	19 26 15.60	2.0653	S. 16° 51' 6.3"	3.641
1	17 48 55.69	2.0743	18 12 20.2	0.319	1	19 28 19.51	2.0650	16 47 25.5	3.780
2	17 51 0.14	2.0741	18 12 30.8	0.135	2	19 30 23.40	2.0648	16 43 39.9	3.800
3	17 53 4.58	2.0740	18 12 36.4	- 0.032	3	19 32 27.28	2.0645	16 39 49.5	3.879
4	17 55 9.02	2.0740	18 12 37.0	+ 0.032	4	19 34 31.14	2.0641	16 35 54.4	3.957
5	17 57 13.46	2.0740	18 12 32.6	0.115	5	19 36 34.97	2.0637	16 31 54.7	4.034
6	17 59 17.90	2.0739	18 12 23.2	0.198	6	19 38 38.78	2.0634	16 27 50.3	4.112
7	18 1 22.33	2.0739	18 12 8.8	0.982	7	19 40 42.57	2.0631	16 23 41.2	4.191
8	18 3 26.76	2.0738	18 11 49.4	0.306	8	19 42 46.35	2.0628	16 19 27.4	4.268
9	18 5 31.18	2.0737	18 11 24.9	0.449	9	19 44 50.11	2.0624	16 15 9.0	4.346
10	18 7 35.60	2.0736	18 10 55.5	0.532	10	19 46 53.84	2.0621	16 10 45.9	4.423
11	18 9 40.01	2.0734	18 10 21.1	0.616	11	19 48 57.56	2.0618	16 6 18.2	4.500
12	18 11 44.41	2.0733	18 9 41.6	0.700	12	19 51 1.26	2.0615	16 1 45.9	4.577
13	18 13 48.81	2.0732	18 8 57.1	0.783	13	19 53 4.94	2.0612	15 57 9.0	4.653
14	18 15 53.20	2.0732	18 8 7.6	0.866	14	19 55 8.60	2.0608	15 52 27.5	4.729
15	18 17 57.59	2.0731	18 7 13.1	0.949	15	19 57 12.24	2.0605	15 47 41.5	4.805
16	18 20 1.97	2.0729	18 6 13.7	1.032	16	19 59 15.86	2.0602	15 42 50.9	4.881
17	18 22 6.34	2.0727	18 5 9.3	1.115	17	20 1 19.46	2.0598	15 37 55.8	4.956
18	18 24 10.70	2.0726	18 3 59.9	1.198	18	20 3 23.04	2.0595	15 32 56.2	5.031
19	18 26 15.05	2.0724	18 2 45.5	1.282	19	20 5 26.60	2.0592	15 27 52.1	5.106
20	18 28 19.39	2.0723	18 1 26.1	1.365	20	20 7 30.14	2.0589	15 22 43.5	5.181
21	18 30 23.73	2.0721	18 0 1.7	1.447	21	20 9 33.67	2.0586	15 17 30.4	5.255
22	18 32 28.05	2.0719	17 58 32.4	1.530	22	20 11 37.17	2.0582	15 12 12.9	5.329
23	18 34 32.36	2.0717	S. 17° 56' 58.1"	1.613	23	20 13 40.65	2.0579	S. 15° 6' 51.0"	5.402
TUESDAY 10.					THURSDAY 12.				
0	18 36 36.66	2.0716	S. 17° 55' 18.8"	1.696	0	20 15 44.12	2.0576	S. 15° 1' 24.7"	5.475
1	18 38 40.95	2.0714	17 53 34.6	1.778	1	20 17 47.57	2.0573	14 55 54.0	5.548
2	18 40 45.23	2.0712	17 51 45.4	1.861	2	20 19 51.00	2.0570	14 50 18.9	5.622
3	18 42 49.49	2.0709	17 49 51.3	1.943	3	20 21 54.41	2.0567	14 44 39.4	5.694
4	18 44 53.74	2.0707	17 47 52.3	2.025	4	20 23 57.80	2.0564	14 38 55.6	5.766
5	18 46 57.98	2.0706	17 45 48.3	2.107	5	20 26 1.18	2.0562	14 33 7.5	5.837
6	18 49 2.21	2.0703	17 43 39.4	2.190	6	20 28 4.54	2.0559	14 27 15.1	5.908
7	18 51 6.42	2.0701	17 41 25.5	2.272	7	20 30 7.88	2.0556	14 21 18.5	5.979
8	18 53 10.62	2.0698	17 39 6.8	2.353	8	20 32 11.21	2.0553	14 15 17.6	6.051
9	18 55 14.80	2.0696	17 36 43.2	2.434	9	20 34 14.52	2.0550	14 9 12.4	6.122
10	18 57 18.97	2.0693	17 34 14.7	2.516	10	20 36 17.81	2.0547	14 3 3.0	6.191
11	18 59 23.12	2.0691	17 31 41.3	2.597	11	20 38 21.09	2.0545	13 56 49.5	6.260
12	19 1 27.26	2.0688	17 29 3.0	2.679	12	20 40 24.35	2.0542	13 50 31.8	6.329
13	19 3 31.38	2.0685	17 26 19.8	2.760	13	20 42 27.60	2.0540	13 44 10.0	6.398
14	19 5 35.48	2.0682	17 23 31.8	2.841	14	20 44 30.83	2.0537	13 37 44.0	6.467
15	19 7 39.57	2.0680	17 20 38.9	2.922	15	20 46 34.05	2.0536	13 31 13.9	6.535
16	19 9 43.64	2.0677	17 17 41.2	3.002	16	20 48 37.26	2.0534	13 24 39.8	6.602
17	19 11 47.70	2.0675	17 14 38.7	3.082	17	20 50 40.46	2.0532	13 18 1.6	6.670
18	19 13 51.74	2.0672	17 11 31.3	3.163	18	20 52 43.64	2.0529	13 11 19.4	6.737
19	19 15 55.76	2.0669	17 8 19.1	3.243	19	20 54 46.81	2.0527	13 4 33.2	6.803
20	19 17 59.76	2.0666	17 5 2.1	3.323	20	20 56 49.97	2.0526	12 57 43.0	6.870
21	19 20 3.75	2.0663	17 1 40.3	3.403	21	20 58 53.12	2.0524	12 50 48.8	6.936
22	19 22 7.72	2.0660	16 58 13.7	3.482	22	21 0 56.26	2.0523	12 43 50.7	7.001
23	19 24 11.67	2.0657	16 54 42.4	3.562	23	21 2 50.39	2.0522	12 36 48.7	7.066
24	19 26 15.60	2.0653	S. 16° 51' 6.3"	3.641	24	21 5 2.52	2.0521	S. 12° 29' 42.8"	7.130

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 13.					SUNDAY 15.				
0	21 5 2.52	2.0591	S. 12° 29' 42.8"	7.130	0	22 43 40.11	2.0648	S. 5° 42' 46.9"	9.004
1	21 7 5.64	2.0519	12 22 33.1	7.194	1	22 45 44.02	2.0656	5 33 9.6	9.040
2	21 9 8.75	2.0518	12 15 19.5	7.258	2	22 47 47.98	2.0664	5 23 30.1	9.076
3	21 11 11.85	2.0517	12 8 2.1	7.321	3	22 49 51.99	2.0672	5 13 48.5	9.110
4	21 13 14.95	2.0516	12 0 41.0	7.383	4	22 51 56.05	2.0681	5 4 4.9	9.144
5	21 15 18.04	2.0514	11 53 16.1	7.446	5	22 54 0.16	2.0690	4 54 19.3	9.178
6	21 17 21.12	2.0513	11 45 47.5	7.507	6	22 56 4.33	2.0700	4 44 31.6	9.211
7	21 19 24.20	2.0513	11 38 15.2	7.568	7	22 58 8.56	2.0709	4 34 42.0	9.243
8	21 21 27.28	2.0513	11 30 39.3	7.629	8	23 0 12.84	2.0718	4 24 50.6	9.273
9	21 23 30.36	2.0513	11 22 59.7	7.690	9	23 2 17.18	2.0726	4 14 57.3	9.303
10	21 25 33.44	2.0513	11 15 16.5	7.750	10	23 4 21.58	2.0735	4 5 2.2	9.333
11	21 27 36.52	2.0513	11 7 29.7	7.809	11	23 6 26.05	2.0750	3 55 5.4	9.361
12	21 29 39.60	2.0513	10 59 39.4	7.867	12	23 8 30.58	2.0761	3 45 6.9	9.388
13	21 31 42.68	2.0513	10 51 45.6	7.926	13	23 10 35.18	2.0772	3 35 6.8	10.015
14	21 33 45.76	2.0514	10 43 48.3	7.984	14	23 12 39.84	2.0783	3 25 5.1	10.048
15	21 35 48.85	2.0515	10 35 47.5	8.043	15	23 14 44.57	2.0795	3 15 1.8	10.080
16	21 37 51.94	2.0516	10 27 43.3	8.098	16	23 16 49.38	2.0807	3 4 57.0	10.093
17	21 39 55.04	2.0517	10 19 35.7	8.154	17	23 18 54.26	2.0819	2 54 50.7	10.117
18	21 41 58.14	2.0518	10 11 24.8	8.209	18	23 20 59.21	2.0832	2 44 43.0	10.139
19	21 44 1.25	2.0519	10 3 10.6	8.265	19	23 23 4.24	2.0845	2 34 34.0	10.161
20	21 46 4.37	2.0521	9 54 53.0	8.321	20	23 25 9.35	2.0858	2 24 23.7	10.180
21	21 48 7.50	2.0522	9 46 32.1	8.375	21	23 27 14.53	2.0871	2 14 12.1	10.203
22	21 50 10.64	2.0524	9 38 8.0	8.427	22	23 29 19.80	2.0885	2 3 59.3	10.223
23	21 52 13.79	2.0527	S. 9° 29' 40.8"	8.480	23	23 31 25.15	2.0899	S. 1° 53' 45.4"	10.241
SATURDAY 14.					MONDAY 16.				
0	21 54 16.96	2.0529	S. 9° 21' 10.4"	8.532	0	23 33 30.50	2.0913	S. 1° 43' 30.4"	10.259
1	21 56 20.14	2.0532	9 12 36.9	8.584	1	23 35 36.11	2.0926	1 33 14.3	10.277
2	21 58 23.34	2.0534	9 4 0.3	8.636	2	23 37 41.72	2.0943	1 22 57.2	10.293
3	22 0 26.55	2.0537	8 55 20.6	8.687	3	23 39 47.43	2.0959	1 12 39.2	10.308
4	22 2 29.78	2.0540	8 46 37.9	8.737	4	23 41 53.23	2.0974	1 2 20.3	10.322
5	22 4 33.03	2.0543	8 37 52.2	8.787	5	23 43 59.12	2.0990	0 52 0.6	10.336
6	22 6 36.30	2.0547	8 29 3.5	8.836	6	23 46 5.11	2.1007	0 41 40.0	10.349
7	22 8 39.59	2.0550	8 20 11.9	8.884	7	23 48 11.20	2.1023	0 31 18.7	10.360
8	22 10 42.90	2.0554	8 11 17.5	8.931	8	23 50 17.39	2.1039	0 20 56.8	10.371
9	22 12 46.24	2.0558	8 2 20.2	8.978	9	23 52 23.67	2.1056	0 10 34.2	10.382
10	22 14 49.60	2.0562	7 53 20.1	9.024	10	23 54 30.06	2.1073	S. 0° 0' 11.0"	10.391
11	22 16 52.99	2.0567	7 44 17.3	9.070	11	23 56 36.55	2.1091	N. 0° 10' 12.7"	10.398
12	22 18 56.41	2.0572	7 35 11.7	9.116	12	23 58 43.15	2.1109	0 20 36.8	10.405
13	22 20 59.85	2.0577	7 26 3.4	9.160	13	0 0 49.86	2.1127	0 31 1.3	10.412
14	22 23 3.33	2.0582	7 16 52.5	9.203	14	0 2 56.68	2.1146	0 41 26.2	10.417
15	22 25 6.84	2.0587	7 7 39.0	9.246	15	0 5 3.61	2.1165	0 51 51.4	10.422
16	22 27 10.38	2.0593	6 58 23.0	9.288	16	0 7 10.66	2.1184	1 2 16.8	10.425
17	22 29 13.96	2.0600	6 49 4.4	9.331	17	0 9 17.82	2.1203	1 12 42.4	10.427
18	22 31 17.58	2.0606	6 39 43.3	9.373	18	0 11 25.10	2.1223	1 23 8.1	10.429
19	22 33 21.23	2.0612	6 30 19.7	9.415	19	0 13 32.50	2.1243	1 33 33.9	10.430
20	22 35 24.92	2.0619	6 20 53.8	9.459	20	0 15 40.02	2.1264	1 43 59.7	10.429
21	22 37 28.65	2.0626	6 11 25.5	9.491	21	0 17 47.67	2.1285	1 54 25.4	10.428
22	22 39 32.43	2.0633	6 1 54.9	9.529	22	0 19 55.44	2.1306	2 4 51.0	10.426
23	22 41 36.25	2.0640	5 52 22.0	9.567	23	0 22 3.34	2.1327	2 15 16.5	10.423
24	22 43 40.11	2.0648	S. 5° 42' 46.9"	9.604	24	0 24 11.36	2.1348	N. 2° 25' 41.7"	10.418

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 17.					THURSDAY 19.				
0	<sup>h</sup> 0 <sup>m</sup> 24 <sup>s</sup> 11.36	2.1348	N. 2° 25' 41.7"	10.418	0	<sup>h</sup> 2 <sup>m</sup> 9 <sup>s</sup> 38.91	2.2679	N. 10° 21' 15.3"	8.991
1	0 26 19.51	2.1370	2 36 6.6	10.413	1	2 11 55.08	2.2711	10 30 13.1	8.935
2	0 28 27.80	2.1399	2 46 31.2	10.407	2	2 14 11.44	2.2743	10 39 7.5	8.877
3	0 30 36.22	2.1415	2 56 55.4	10.399	3	2 16 28.00	2.2776	10 47 58.4	8.819
4	0 32 44.78	2.1437	3 7 19.1	10.391	4	2 18 44.75	2.2808	10 56 45.8	8.760
5	0 34 53.47	2.1460	3 17 42.3	10.381	5	2 21 1.70	2.2841	11 5 29.6	8.699
6	0 37 2.30	2.1483	3 28 4.8	10.370	6	2 23 18.84	2.2873	11 14 9.7	8.638
7	0 39 11.27	2.1507	3 38 26.7	10.359	7	2 25 36.18	2.2906	11 22 46.1	8.576
8	0 41 20.38	2.1531	3 48 47.9	10.347	8	2 27 53.71	2.2938	11 31 18.8	8.513
9	0 43 29.64	2.1555	3 59 8.4	10.334	9	2 30 11.44	2.2971	11 39 47.7	8.448
10	0 45 39.04	2.1579	4 9 28.0	10.319	10	2 32 29.37	2.3004	11 48 12.6	8.383
11	0 47 48.59	2.1604	4 19 46.7	10.304	11	2 34 47.49	2.3036	11 56 33.6	8.317
12	0 49 58.29	2.1629	4 30 4.5	10.288	12	2 37 5.80	2.3069	12 4 50.6	8.249
13	0 52 8.14	2.1654	4 40 21.3	10.271	13	2 39 24.31	2.3102	12 13 3.5	8.180
14	0 54 18.14	2.1680	4 50 37.0	10.252	14	2 41 43.02	2.3135	12 21 12.2	8.110
15	0 56 28.30	2.1706	5 0 51.5	10.232	15	2 44 1.93	2.3167	12 29 16.7	8.040
16	0 58 38.61	2.1732	5 11 4.8	10.212	16	2 46 21.03	2.3199	12 37 17.0	7.968
17	1 0 49.08	2.1758	5 21 16.9	10.190	17	2 48 40.32	2.3232	12 45 12.9	7.895
18	1 2 59.71	2.1785	5 31 27.6	10.167	18	2 50 59.81	2.3264	12 53 4.4	7.822
19	1 5 10.50	2.1819	5 41 37.0	10.144	19	2 53 19.49	2.3297	13 0 51.5	7.747
20	1 7 21.45	2.1839	5 51 44.9	10.119	20	2 55 39.37	2.3329	13 8 34.1	7.673
21	1 9 32.56	2.1866	6 1 51.3	10.093	21	2 57 59.44	2.3362	13 16 12.1	7.594
22	1 11 43.84	2.1893	6 11 56.1	10.067	22	3 0 19.71	2.3394	13 23 45.4	7.516
23	1 13 55.28	2.1920	N. 6 21 59.3	10.038	23	3 2 40.17	2.3426	N. 13 31 14.0	7.437
WEDNESDAY 18.					FRIDAY 20.				
0	1 16 6.88	2.1948	N. 6 32 0.7	10.009	0	3 5 0.82	2.3458	N. 13 38 37.9	7.358
1	1 18 18.65	2.1977	6 42 0.4	9.980	1	3 7 21.67	2.3490	13 45 57.0	7.277
2	1 20 30.60	2.2006	6 51 58.3	9.949	2	3 9 42.70	2.3521	13 53 11.2	7.196
3	1 22 42.72	2.2034	7 1 54.3	9.917	3	3 12 3.92	2.3552	14 0 20.5	7.113
4	1 24 55.01	2.2063	7 11 48.3	9.883	4	3 14 25.33	2.3584	14 7 24.8	7.030
5	1 27 7.48	2.2092	7 21 40.2	9.847	5	3 16 46.93	2.3616	14 14 24.1	6.945
6	1 29 20.12	2.2122	7 31 29.9	9.811	6	3 19 8.72	2.3647	14 21 18.2	6.859
7	1 31 32.94	2.2152	7 41 17.5	9.776	7	3 21 30.70	2.3678	14 28 7.2	6.773
8	1 33 45.94	2.2181	7 51 3.0	9.739	8	3 23 52.86	2.3708	14 34 51.0	6.686
9	1 35 59.11	2.2210	8 0 46.2	9.701	9	3 26 15.20	2.3738	14 41 29.5	6.597
10	1 38 12.46	2.2241	8 10 27.1	9.661	10	3 28 37.72	2.3768	14 48 2.7	6.508
11	1 40 26.00	2.2272	8 20 5.5	9.619	11	3 31 0.42	2.3799	14 54 30.5	6.418
12	1 42 39.72	2.2303	8 29 41.4	9.577	12	3 33 23.31	2.3830	15 0 52.8	6.327
13	1 44 53.62	2.2333	8 39 14.7	9.534	13	3 35 46.38	2.3860	15 7 9.7	6.236
14	1 47 7.71	2.2363	8 48 45.4	9.490	14	3 38 9.62	2.3897	15 13 21.1	6.143
15	1 49 21.98	2.2394	8 58 13.5	9.446	15	3 40 33.03	2.3916	15 19 26.9	6.049
16	1 51 36.44	2.2426	9 7 38.9	9.400	16	3 42 56.61	2.3945	15 25 27.0	5.954
17	1 53 51.09	2.2457	9 17 1.5	9.352	17	3 45 20.37	2.3974	15 31 21.4	5.859
18	1 56 5.92	2.2488	9 26 21.2	9.303	18	3 47 44.30	2.4009	15 37 10.1	5.763
19	1 58 20.95	2.2520	9 35 37.9	9.253	19	3 50 8.40	2.4030	15 42 53.0	5.667
20	2 0 36.16	2.2551	9 44 51.6	9.203	20	3 52 32.66	2.4057	15 48 30.1	5.569
21	2 2 51.56	2.2582	9 54 2.2	9.152	21	3 54 57.09	2.4085	15 54 1.3	5.470
22	2 5 7.15	2.2614	10 3 9.8	9.100	22	3 57 21.68	2.4119	15 59 26.5	5.370
23	2 7 22.93	2.2647	10 12 14.2	9.046	23	3 50 46.43	2.4138	16 4 45.7	5.271
24	2 9 38.91	2.2679	N. 10 21 15.3	8.991	24	4 2 11.34	2.4165	N. 16 9 59.0	5.171



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 21.					MONDAY 23.				
0	4 2 11.34	2.4185	N.16 9 59.0	5.171	0	6 0 17.58	2.4630	N.18 10 57.2	0.380
1	4 4 36.41	2.4191	16 15 6.2	5.069	1	6 2 46.56	2.4639	18 10 36.8	0.399
2	4 7 1.63	2.4216	16 20 7.3	4.967	2	6 5 15.53	2.4697	18 10 9.3	0.518
3	4 9 27.00	2.4241	16 25 2.2	4.863	3	6 7 44.49	2.4695	18 9 34.6	0.638
4	4 11 52.52	2.4265	16 29 50.9	4.759	4	6 10 13.43	2.4693	18 8 52.7	0.758
5	4 14 18.18	2.4289	16 34 33.3	4.655	5	6 12 42.36	2.4690	18 8 3.6	0.877
6	4 16 43.99	2.4313	16 39 9.5	4.550	6	6 15 11.27	2.4616	18 7 7.4	0.997
7	4 19 9.94	2.4337	16 43 39.3	4.444	7	6 17 40.15	2.4611	18 6 4.0	1.116
8	4 21 36.03	2.4360	16 48 2.8	4.338	8	6 20 9.00	2.4605	18 4 53.5	1.234
9	4 24 2.26	2.4382	16 52 19.9	4.231	9	6 22 37.81	2.4798	18 3 35.9	1.352
10	4 26 28.62	2.4404	16 56 30.5	4.124	10	6 25 6.58	2.4798	18 2 11.2	1.471
11	4 28 55.11	2.4425	17 0 34.7	4.016	11	6 27 35.32	2.4798	18 0 39.4	1.590
12	4 31 21.72	2.4446	17 4 32.4	3.907	12	6 30 4.01	2.4778	17 59 0.4	1.709
13	4 33 48.46	2.4467	17 8 23.5	3.797	13	6 32 32.65	2.4769	17 57 14.3	1.826
14	4 36 15.33	2.4488	17 12 8.0	3.687	14	6 35 1.24	2.4761	17 55 21.2	1.943
15	4 38 42.32	2.4507	17 15 45.9	3.576	15	6 37 29.78	2.4751	17 53 21.1	2.060
16	4 41 9.42	2.4526	17 19 17.1	3.464	16	6 39 58.25	2.4740	17 51 14.0	2.177
17	4 43 36.63	2.4544	17 22 41.6	3.353	17	6 42 26.66	2.4730	17 48 59.8	2.295
18	4 46 3.95	2.4563	17 25 59.5	3.241	18	6 44 55.01	2.4719	17 46 38.6	2.412
19	4 48 31.38	2.4580	17 29 10.6	3.128	19	6 47 23.29	2.4707	17 44 10.4	2.527
20	4 50 58.91	2.4597	17 32 14.9	3.015	20	6 49 51.49	2.4694	17 41 35.3	2.643
21	4 53 26.54	2.4613	17 35 12.4	2.902	21	6 52 19.62	2.4681	17 38 53.3	2.757
22	4 55 54.27	2.4629	17 38 3.1	2.788	22	6 54 47.67	2.4667	17 36 4.4	2.872
23	4 58 22.09	2.4645	N.17 40 46.9	2.673	23	6 57 15.63	2.4652	N.17 33 8.6	2.987
SUNDAY 22.					TUESDAY 24.				
0	5 0 50.01	2.4660	N.17 43 23.9	2.558	0	6 59 43.50	2.4637	N.17 30 5.9	3.102
1	5 3 18.01	2.4674	17 45 53.9	2.443	1	7 2 11.28	2.4622	17 26 56.4	3.215
2	5 5 46.09	2.4688	17 48 17.0	2.327	2	7 4 38.97	2.4607	17 23 40.1	3.328
3	5 8 14.26	2.4701	17 50 33.1	2.210	3	7 7 6.57	2.4591	17 20 17.1	3.440
4	5 10 42.50	2.4713	17 52 42.2	2.094	4	7 9 34.06	2.4574	17 16 47.3	3.553
5	5 13 10.81	2.4724	17 54 44.4	1.978	5	7 12 1.45	2.4557	17 13 10.7	3.666
6	5 15 39.19	2.4736	17 56 39.6	1.861	6	7 14 28.74	2.4539	17 9 27.4	3.777
7	5 18 7.64	2.4747	17 58 27.7	1.743	7	7 16 55.92	2.4520	17 5 37.5	3.887
8	5 20 36.15	2.4758	18 0 8.8	1.626	8	7 19 22.98	2.4501	17 1 41.0	3.996
9	5 23 4.71	2.4765	18 1 42.8	1.508	9	7 21 49.93	2.4482	16 57 38.0	4.105
10	5 25 33.33	2.4774	18 3 9.7	1.389	10	7 24 16.76	2.4462	16 53 28.4	4.214
11	5 28 2.00	2.4782	18 4 29.5	1.271	11	7 26 43.47	2.4442	16 49 12.3	4.323
12	5 30 30.71	2.4789	18 5 42.3	1.153	12	7 29 10.06	2.4421	16 44 49.6	4.431
13	5 32 59.47	2.4796	18 6 47.9	1.034	13	7 31 36.52	2.4399	16 40 20.5	4.538
14	5 35 28.27	2.4802	18 7 46.4	0.915	14	7 34 2.85	2.4378	16 35 45.0	4.644
15	5 37 57.10	2.4808	18 8 37.7	0.796	15	7 36 29.05	2.4356	16 31 3.2	4.749
16	5 40 25.97	2.4813	18 9 21.9	0.677	16	7 38 55.12	2.4333	16 26 15.1	4.854
17	5 42 54.86	2.4818	18 9 58.9	0.557	17	7 41 21.05	2.4311	16 21 20.7	4.959
18	5 45 23.78	2.4822	18 10 28.7	0.437	18	7 43 46.85	2.4288	16 16 20.0	5.063
19	5 47 52.72	2.4824	18 10 51.4	0.318	19	7 46 12.51	2.4264	16 11 13.1	5.166
20	5 50 21.67	2.4827	18 11 6.9	0.198	20	7 48 38.02	2.4239	16 6 0.1	5.268
21	5 52 50.64	2.4829	18 11 15.2	+ 0.079	21	7 51 3.38	2.4215	16 0 41.0	5.369
22	5 55 19.62	2.4830	18 11 16.4	- 0.040	22	7 53 28.60	2.4191	15 55 15.8	5.470
23	5 57 48.60	2.4830	18 11 10.4	0.160	23	7 55 53.67	2.4166	15 49 44.6	5.570
24	6 0 17.58	2.4830	N.18 10 57.2	0.280	24	7 58 18.50	2.4140	N.15 44 7.4	5.669

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 25.					FRIDAY 27.				
0	h m s	s	N. 15° 44' 7.4"	5.666	0	h m s	s	N. 9° 34' 39.8"	9.346
1	7 58 18.59	2.4140	15 38 24.3	5.767	1	9 50 52.38	2.3738	9 25 17.5	9.397
2	8 0 43.35	2.4114	15 32 35.3	5.865	2	9 53 8.68	2.3709	9 15 52.1	9.448
3	8 3 7.96	2.4088	15 26 40.5	5.962	3	9 55 24.80	2.3679	9 6 23.7	9.498
4	8 5 32.41	2.4062	15 20 39.9	6.058	4	9 57 40.75	2.3643	8 56 52.4	9.546
5	8 7 56.70	2.4035	15 14 33.5	6.154	5	9 59 56.52	2.3614	8 47 18.2	9.593
6	8 10 20.83	2.4008	15 8 21.4	6.248	6	10 2 12.12	2.3586	8 37 41.3	9.638
7	8 12 44.80	2.3981	15 2 3.7	6.341	7	10 4 27.55	2.3557	8 28 1.7	9.683
8	8 15 8.61	2.3954	14 55 40.5	6.434	8	10 6 42.81	2.3528	8 18 19.4	9.728
9	8 17 32.25	2.3926	14 49 11.7	6.526	9	10 8 57.89	2.3499	8 8 34.4	9.771
10	8 19 55.72	2.3897	14 42 37.4	6.617	10	10 11 12.80	2.3471	7 58 46.9	9.819
11	8 22 19.02	2.3869	14 35 57.7	6.707	11	10 13 27.55	2.3444	7 48 57.0	9.862
12	8 24 42.15	2.3841	14 29 12.6	6.796	12	10 15 42.13	2.3416	7 39 4.7	9.901
13	8 27 5.12	2.3813	14 22 22.2	6.884	13	10 17 56.54	2.3388	7 29 10.1	9.939
14	8 29 27.91	2.3784	14 15 26.5	6.971	14	10 20 10.79	2.3361	7 19 13.2	9.987
15	8 31 50.53	2.3755	14 8 25.7	7.057	15	10 22 24.87	2.3334	7 9 14.1	10.033
16	8 34 12.97	2.3726	14 1 19.7	7.143	16	10 24 38.79	2.3307	6 59 12.9	10.079
17	8 36 35.24	2.3697	13 54 8.6	7.228	17	10 26 52.55	2.3280	6 49 9.6	10.124
18	8 38 57.33	2.3667	13 46 52.4	7.312	18	10 29 6.15	2.3253	6 39 4.3	10.166
19	8 41 19.25	2.3638	13 39 31.2	7.394	19	10 31 19.59	2.3227	6 28 57.1	10.213
20	8 43 40.99	2.3608	13 32 5.1	7.475	20	10 33 32.87	2.3201	6 18 48.0	10.258
21	8 46 2.55	2.3578	13 24 34.2	7.555	21	10 35 46.00	2.3175	6 8 37.2	10.294
22	8 48 23.93	2.3548	13 16 58.5	7.635	22	10 37 58.97	2.3149	5 58 24.6	10.339
23	8 50 45.13	2.3518	N. 13° 9' 18.0"	7.715	23	10 40 11.79	2.3124	N. 5° 48' 10.3"	10.385
24	8 53 6.15	2.3487				10 42 24.46	2.3098		
THURSDAY 26.					SATURDAY 28.				
0	8 55 26.98	2.3457	N. 13° 1' 32.7"	7.793	0	10 44 36.97	2.3073	N. 5° 37' 54.4"	10.438
1	8 57 47.63	2.3427	12 53 42.8	7.869	1	10 46 49.33	2.3048	5 27 37.0	10.483
2	9 0 8.10	2.3397	12 45 48.4	7.944	2	10 49 1.55	2.3025	5 17 18.1	10.528
3	9 2 28.40	2.3367	12 37 49.5	8.018	3	10 51 13.63	2.3001	5 6 57.8	10.573
4	9 4 48.51	2.3337	12 29 46.2	8.093	4	10 53 25.56	2.2977	4 56 36.2	10.618
5	9 7 8.44	2.3306	12 21 38.4	8.167	5	10 55 37.35	2.2953	4 46 13.2	10.663
6	9 9 28.18	2.3275	12 13 26.2	8.238	6	10 57 48.99	2.2929	4 35 49.0	10.708
7	9 11 47.74	2.3245	12 5 9.8	8.308	7	11 0 0.49	2.2906	4 25 23.7	10.753
8	9 14 7.12	2.3214	11 56 49.3	8.377	8	11 2 11.86	2.2883	4 14 57.3	10.798
9	9 16 26.31	2.3183	11 48 24.6	8.446	9	11 4 23.09	2.2861	4 4 29.9	10.843
10	9 18 45.32	2.3153	11 39 55.8	8.513	10	11 6 34.19	2.2838	3 54 1.5	10.888
11	9 21 4.15	2.3123	11 31 23.0	8.580	11	11 8 45.15	2.2816	3 43 32.2	10.933
12	9 23 22.80	2.3092	11 22 46.2	8.646	12	11 10 55.98	2.2794	3 33 2.1	10.978
13	9 25 41.26	2.3062	11 14 5.5	8.710	13	11 13 6.68	2.2773	3 22 31.2	11.023
14	9 27 59.54	2.3032	11 5 21.0	8.773	14	11 15 17.25	2.2751	3 11 59.6	11.068
15	9 30 17.64	2.3002	10 56 32.8	8.835	15	11 17 27.70	2.2731	3 1 27.4	11.113
16	9 32 35.56	2.2971	10 47 40.8	8.897	16	11 19 38.02	2.2710	2 50 54.6	11.158
17	9 34 53.29	2.2940	10 38 45.2	8.958	17	11 21 48.22	2.2689	2 40 21.3	11.203
18	9 37 10.84	2.2910	10 29 46.1	9.014	18	11 23 58.29	2.2669	2 29 47.6	11.248
19	9 39 28.21	2.2880	10 20 43.5	9.072	19	11 26 8.24	2.2649	2 19 13.5	11.293
20	9 41 45.40	2.2850	10 11 37.4	9.130	20	11 28 18.08	2.2630	2 8 39.0	11.338
21	9 44 2.41	2.2820	10 2 27.9	9.186	21	11 30 27.80	2.2610	1 58 4.3	11.383
22	9 46 19.24	2.2791	9 53 15.1	9.241	22	11 32 37.40	2.2591	1 47 29.4	11.428
23	9 48 35.90	2.2762	9 43 59.0	9.294	23	11 34 46.89	2.2572	1 36 54.3	11.473
24	9 50 52.38	2.2732	N. 9° 34' 39.8"	9.346	24	11 36 56.27	2.2554	N. 1° 26' 19.1"	11.518

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 29.					TUESDAY 31.				
0	11 36 56.27	2.1554	N. 1° 26' 19".1	10.587	0	13 18 48.93	2.0997	S. 6° 44' 35.1"	9.525
1	11 39 5.54	2.1536	1 15 43.9	10.586	1	13 20 54.90	2.0992	6 54 5.3	9.483
2	11 41 14.70	2.1518	1 5 8.8	10.584	2	13 23 0.84	2.0987	7 3 33.0	9.440
3	11 43 23.76	2.1501	0 54 33.8	10.582	3	13 25 6.74	2.0981	7 12 58.1	9.398
4	11 45 32.71	2.1484	0 43 58.9	10.580	4	13 27 12.61	2.0976	7 22 20.5	9.350
5	11 47 41.56	2.1467	0 33 24.2	10.578	5	13 29 18.45	2.0972	7 31 40.1	9.304
6	11 49 50.31	2.1450	0 22 49.8	10.576	6	13 31 24.27	2.0967	7 40 57.0	9.258
7	11 51 58.96	2.1433	0 12 15.8	10.564	7	13 33 30.06	2.0963	7 50 11.1	9.211
8	11 54 7.51	2.1417	N. 0 1 42.2	10.557	8	13 35 35.83	2.0959	7 59 22.3	9.164
9	11 56 15.96	2.1401	S. 0 8 51.0	10.549	9	13 37 41.57	2.0955	8 8 30.7	9.116
10	11 58 24.32	2.1386	0 19 23.7	10.540	10	13 39 47.29	2.0952	8 17 36.2	9.067
11	12 0 32.50	2.1371	0 29 55.8	10.532	11	13 41 52.99	2.0948	8 26 38.7	9.016
12	12 2 40.77	2.1356	0 40 27.2	10.518	12	13 43 58.67	2.0945	8 35 38.1	8.965
13	12 4 48.86	2.1341	0 50 58.0	10.507	13	13 46 4.33	2.0942	8 44 34.5	8.914
14	12 6 56.86	2.1327	1 1 28.0	10.493	14	13 48 9.97	2.0938	8 53 27.8	8.862
15	12 9 4.78	2.1313	1 11 57.2	10.479	15	13 50 15.59	2.0936	9 2 18.0	8.810
16	12 11 12.62	2.1299	1 22 25.5	10.464	16	13 52 21.20	2.0933	9 11 5.0	8.757
17	12 13 20.37	2.1285	1 32 52.9	10.449	17	13 54 26.79	2.0930	9 19 48.8	8.703
18	12 15 28.04	2.1272	1 43 19.4	10.433	18	13 56 32.36	2.0928	9 28 29.4	8.649
19	12 17 35.64	2.1260	1 53 44.8	10.414	19	13 58 37.92	2.0926	9 37 6.7	8.594
20	12 19 43.16	2.1247	2 4 9.1	10.396	20	14 0 43.47	2.0924	9 45 40.7	8.538
21	12 21 50.60	2.1234	2 14 32.3	10.377	21	14 2 49.01	2.0922	9 54 11.3	8.482
22	12 23 57.97	2.1222	2 24 54.3	10.357	22	14 4 54.54	2.0920	10 2 38.5	8.425
23	12 26 5.27	2.1210	S. 2 35 15.1	10.336	23	14 7 0.05	2.0918	S. 10 11 2.3	8.367
MONDAY 30.					WEDNESDAY, APRIL 1.				
0	12 28 12.49	2.1198	S. 2 45 34.5	10.313	0	14 9 5.55	2.0917	S. 10 19 22.6	8.309
1	12 30 19.65	2.1187	2 55 52.6	10.290	PHASES OF THE MOON.				
2	12 32 26.74	2.1177	3 6 9.3	10.266					
3	12 34 33.77	2.1166	3 16 24.5	10.241					
4	12 36 40.73	2.1155	3 26 38.2	10.215					
5	12 38 47.63	2.1145	3 36 50.3	10.188	<div>☾ Last Quarter . . Mar. 8 6 54.1</div> <div>● New Moon . . . . 16 5 36.9</div> <div>☽ First Quarter . . . . 23 5 23.1</div> <div>○ Full Moon . . . . 30 4 40.0</div>				
6	12 40 54.47	2.1135	3 47 0.8	10.161					
7	12 43 1.25	2.1125	3 57 9.6	10.132					
8	12 45 7.97	2.1116	4 7 16.7	10.103					
9	12 47 14.64	2.1107	4 17 22.0	10.073	<div>☾ Apogee . . . . Mar. 9 8.3</div> <div>☾ Perigee . . . . . 23 9.0</div>				
10	12 49 21.25	2.1098	4 27 25.5	10.042					
11	12 51 27.81	2.1089	4 37 27.1	10.011					
12	12 53 34.32	2.1081	4 47 26.8	9.978					
13	12 55 40.78	2.1072	4 57 24.5	9.945					
14	12 57 47.19	2.1064	5 7 20.2	9.911					
15	12 59 53.55	2.1057	5 17 13.8	9.876					
16	13 1 59.87	2.1049	5 27 5.3	9.840					
17	13 4 6.14	2.1042	5 36 54.6	9.803					
18	13 6 12.37	2.1035	5 46 41.7	9.766					
19	13 8 18.56	2.1028	5 56 26.5	9.728					
20	13 10 24.71	2.1022	6 6 9.0	9.689					
21	13 12 30.82	2.1015	6 15 49.2	9.650					
22	13 14 36.89	2.1009	6 25 27.0	9.609					
23	13 16 42.93	2.1003	6 35 2.3	9.567					
24	13 18 48.93	2.0997	S. 6 44 35.1	9.525					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Aldebaran W.	97° 3' 16"	9346	98° 48' 9"	9358	100° 32' 44"	9371	102° 17' 1"	9383
	SATURN W.	87 58 0	9369	89 42 29	9374	91 26 41	9387	93 10 34	9400
	Pollux W.	54 21 29	9489	56 3 8	9488	57 44 38	9496	59 25 57	9504
	Regulus W.	17 20 25	9433	19 3 12	9431	20 46 2	9433	22 28 50	9437
	Spica E.	36 46 57	9371	35 2 40	9385	33 18 44	9400	31 35 9	9416
	Antares E.	82 36 20	9403	80 52 50	9416	79 9 38	9429	77 26 45	9443
2	Pollux W.	67 49 17	9557	69 29 11	9569	71 8 49	9582	72 48 9	9594
	Regulus W.	31 0 29	9499	32 42 8	9494	34 23 30	9506	36 4 35	9520
	JUPITER W.	29 51 27	9458	31 33 39	9469	33 15 36	9480	34 57 18	9491
	Antares E.	68 57 20	9517	67 16 31	9534	65 36 5	9550	63 56 1	9567
3	Pollux W.	81 0 13	9686	82 37 39	9690	84 14 45	9695	85 51 31	9710
	Regulus W.	44 25 18	9589	46 4 28	9604	47 43 18	9619	49 21 47	9634
	JUPITER W.	43 21 30	9557	45 1 24	9571	46 40 59	9585	48 20 14	9600
	Antares E.	55 41 43	9657	54 4 6	9677	52 26 55	9697	50 50 11	9717
	α Aquilæ E.	104 49 20	3013	103 19 23	3029	101 49 37	3038	100 20 4	3043
4	Pollux W.	93 50 12	9789	95 24 54	9805	96 59 15	9821	98 33 15	9838
	Regulus W.	57 29 8	9710	59 5 35	9725	60 41 42	9739	62 17 30	9754
	JUPITER W.	56 31 30	9673	58 8 46	9689	59 45 41	9703	61 22 17	9718
	Antares E.	42 53 26	9827	41 19 33	9851	39 46 11	9875	38 13 20	9901
	α Aquilæ E.	92 56 4	3109	91 28 6	3194	90 0 26	3139	88 33 4	3155
	SUN E.	138 21 21	3053	136 52 14	3070	135 23 28	3086	133 55 1	3109
5	Regulus W.	70 11 37	9897	71 45 30	9941	73 19 5	9854	74 52 23	9867
	JUPITER W.	69 20 27	9789	70 55 9	9803	72 29 33	9816	74 3 40	9829
	Spica W.	16 55 33	9913	18 27 35	9912	19 59 38	9915	21 31 38	9919
	Antares E.	30 37 57	3056	29 8 53	3025	27 40 37	3138	26 13 13	3185
	α Aquilæ E.	81 21 9	3941	79 55 48	3958	78 30 48	3977	77 6 10	3995
	SUN E.	126 37 38	3180	125 11 5	3196	123 44 51	3210	122 18 54	3225
6	Regulus W.	82 34 43	9930	84 6 24	9941	85 37 51	9952	87 9 4	9963
	JUPITER W.	81 50 6	9891	83 22 36	9909	84 54 52	9913	86 26 54	9924
	Spica W.	29 9 45	9956	30 40 53	9965	32 11 50	9973	33 42 36	9981
	α Aquilæ E.	70 8 35	3396	68 46 14	3418	67 24 18	3439	66 2 46	3469
	SUN E.	115 13 19	3392	113 48 58	3305	112 24 52	3317	111 1 0	3328
7	Regulus W.	94 41 55	3010	96 11 55	3016	97 41 45	3026	99 11 25	3034
	JUPITER W.	94 3 50	9971	95 34 39	9980	97 5 17	9988	98 35 45	9995
	Spica W.	41 13 54	3091	42 43 41	3098	44 13 19	3035	45 42 48	3042
	α Aquilæ E.	59 21 41	3686	58 2 52	3614	56 44 33	3643	55 26 45	3673
	SUN E.	104 4 48	3379	102 42 8	3388	101 19 38	3396	99 57 17	3404
8	JUPITER W.	106 6 0	3096	107 35 41	3030	109 5 17	3034	110 34 48	3038
	Spica W.	53 8 25	3068	54 37 14	3071	56 5 59	3074	57 34 40	3078
	α Aquilæ E.	49 6 20	3859	47 52 11	3894	46 38 45	3940	45 26 6	3990
	SUN E.	93 7 35	3436	91 45 59	3440	90 24 28	3445	89 3 2	3448
9	Spica W.	64 57 19	3085	66 25 47	3086	67 54 14	3086	69 22 41	3085
	Antares W.	21 4 52	3529	22 24 44	3476	23 45 35	3431	25 7 16	3394
	α Aquilæ E.	39 36 29	4313	38 29 48	4397	37 24 24	4490	36 20 23	4594
	SUN E.	82 16 40	3459	80 55 30	3459	79 34 20	3458	78 13 9	3457

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Aldebaran W.	104° 1' 0"	9396	105° 44' 40"	9410	107° 28' 1"	9494	109° 11' 2"	9437
	SATURN W.	94 54 9	9413	96 37 25	9427	98 20 21	9440	100 2 58	9455
	Pollux W.	61 7 5	9513	62 48 0	9523	64 28 41	9534	66 9 7	9545
	Regulus W.	24 11 32	9443	25 54 5	9451	27 36 27	9461	29 18 35	9471
	Spica E.	29 51 57	9433	28 9 9	9450	26 26 46	9470	24 44 51	9491
	Antares E.	75 44 11	9457	74 1 57	9473	72 20 4	9486	70 38 31	9502
2	Pollux W.	74 27 12	9608	76 5 56	9622	77 44 21	9636	79 22 27	9651
	Regulus W.	37 45 21	9533	39 25 49	9546	41 5 58	9560	42 45 48	9574
	JUPITER W.	36 38 44	9503	38 19 53	9516	40 0 44	9530	41 41 16	9543
	Antares E.	62 16 21	9585	60 37 5	9602	58 58 13	9600	57 19 45	9639
3	Pollux W.	87 27 57	9796	89 4 2	9749	90 39 46	9758	92 15 9	9773
	Regulus W.	50 59 56	9649	52 37 45	9664	54 15 13	9679	55 52 21	9695
	JUPITER W.	49 59 9	9615	51 37 44	9639	53 15 59	9644	54 53 54	9658
	Antares E.	49 13 54	9738	47 38 4	9759	46 2 42	9781	44 27 49	9804
	α Aquilæ E.	98 50 45	3055	97 21 40	3068	95 52 51	3082	94 24 19	3096
4	Pollux W.	100 6 54	9853	101 40 13	9869	103 13 11	9886	104 45 48	9902
	Regulus W.	63 52 58	9769	65 28 6	9784	67 2 55	9798	68 37 25	9814
	JUPITER W.	62 58 33	9732	64 34 30	9747	66 10 8	9761	67 45 27	9775
	Antares E.	36 41 2	9998	35 9 19	9968	33 38 13	9988	32 7 45	3030
	α Aquilæ E.	87 6 1	3179	85 39 18	3188	84 12 54	3205	82 46 51	3223
	SUN E.	132 26 54	3118	130 59 6	3134	129 31 38	3150	128 4 29	3165
5	Regulus W.	76 25 24	9880	77 58 8	9894	79 30 35	9905	81 2 47	9918
	JUPITER W.	75 37 30	9849	77 11 3	9855	78 44 20	9867	80 17 21	9880
	Spica W.	23 3 33	9994	24 35 21	9939	26 6 59	9940	27 38 27	9948
	Antares E.	24 46 46	3239	23 21 23	3301	21 57 13	3373	20 34 26	3459
	α Aquilæ E.	75 41 53	3315	74 17 59	3335	72 54 28	3355	71 31 20	3375
	SUN E.	120 53 15	3239	119 27 52	3253	118 2 45	3266	116 37 54	3280
6	Regulus W.	88 40 3	9973	90 10 49	9983	91 41 23	9993	93 11 45	3002
	JUPITER W.	87 58 42	9935	89 30 17	9944	91 1 40	9954	92 32 51	9963
	Spica W.	35 13 12	9989	36 43 38	9998	38 13 53	3006	39 43 58	3014
	α Aquilæ E.	64 41 40	3486	63 21 0	3509	62 0 46	3534	60 40 59	3560
	SUN E.	109 37 21	3339	108 13 55	3350	106 50 41	3360	105 27 39	3370
7	Regulus W.	100 40 56	3040	102 10 19	3047	103 39 34	3053	105 8 41	3059
	JUPITER W.	100 6 4	3001	101 36 15	3008	103 6 18	3014	104 36 13	3021
	Spica W.	47 12 9	3047	48 41 23	3053	50 10 30	3059	51 39 30	3063
	α Aquilæ E.	54 9 29	3705	52 52 47	3738	51 36 40	3773	50 21 10	3819
	SUN E.	98 35 5	3419	97 13 2	3418	95 51 6	3494	94 29 17	3431
8	JUPITER W.	112 4 14	3041	113 33 36	3043	115 2 55	3046	116 32 11	3048
	Spica W.	59 3 17	3080	60 31 51	3089	62 0 22	3094	63 28 51	3095
	α Aquilæ E.	44 14 17	4044	43 3 21	4102	41 53 21	4165	40 44 22	4235
	SUN E.	87 41 40	3452	86 20 22	3454	84 59 6	3455	83 37 52	3457
9	Spica W.	70 51 9	3083	72 19 39	3089	73 48 11	3090	75 16 45	3078
	Antares W.	26 20 39	3361	27 52 39	3333	29 16 12	3308	30 40 14	3286
	α Aquilæ E.	35 17 53	4710	34 17 2	4849	33 18 0	4989	32 20 56	5154
	SUN E.	76 51 57	3456	75 30 44	3454	74 9 29	3453	72 48 12	3450

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
10	Spica W.	76° 45' 22"	3074	78° 14' 3"	3070	79° 42' 49"	3067	81° 11' 39"	3062
	Antares W.	32 4 42	3085	33 29 34	3047	34 54 47	3020	36 20 21	3014
	Sun E.	71 26 52	3446	70 5 28	3443	68 44 0	3438	67 22 27	3433
11	Spica W.	88 37 23	3034	90 6 53	3007	91 36 32	3021	93 6 19	3013
	Antares W.	43 32 37	3144	44 59 53	3131	46 27 25	3119	47 55 12	3106
	Sun E.	60 33 11	3403	59 10 58	3396	57 48 37	3386	56 26 7	3379
12	Spica W.	100 37 46	2970	102 8 36	2961	103 39 38	2951	105 10 52	2942
	Antares W.	55 17 53	3045	56 47 10	3032	58 16 43	3020	59 46 31	3008
	Sun E.	49 31 5	3333	48 7 32	3323	46 43 47	3319	45 19 49	3301
13	Antares W.	67 19 24	2945	68 50 46	2932	70 22 24	2920	71 54 18	2907
	α Aquilæ W.	28 56 6	2985	29 45 23	2953	30 37 52	2919	31 33 20	2902
	Sun E.	38 16 44	3043	36 51 26	3031	35 25 53	3019	34 0 6	3005
14	Antares W.	79 37 53	2943	81 11 25	2930	82 45 14	2918	84 19 19	2905
	α Aquilæ W.	36 48 2	4153	37 57 13	4046	39 8 7	3949	40 20 37	3880
	Sun E.	26 47 19	3141	25 19 59	3128	23 52 23	3115	22 24 32	3102
18	Sun W.	21 59 57	2765	23 35 11	2756	25 10 37	2747	26 46 14	2739
	Aldebaran E.	48 13 14	2437	46 30 32	2429	44 47 39	2422	43 4 36	2414
	Saturn E.	58 3 10	2467	56 21 11	2460	54 39 2	2454	52 56 44	2448
	Pollux E.	91 45 14	2598	90 4 40	2590	88 23 55	2513	86 43 0	2506
19	Sun W.	34 46 51	2704	36 23 26	2697	38 0 10	2691	39 37 2	2686
	Aldebaran E.	34 26 51	2389	32 42 51	2377	30 58 43	2371	29 14 27	2366
	Saturn E.	44 23 5	2490	42 39 59	2416	40 56 47	2412	39 13 29	2409
	Pollux E.	78 16 10	2478	76 34 26	2473	74 52 35	2469	73 10 38	2466
	Jupiter E.	113 46 9	2367	112 1 47	2361	110 17 16	2355	108 32 36	2349
20	Sun W.	47 43 11	2660	49 20 45	2656	50 58 24	2652	52 36 9	2648
	Saturn E.	30 36 6	2401	28 52 33	2402	27 9 1	2404	25 25 32	2406
	Pollux E.	64 39 58	2456	62 57 43	2455	61 15 27	2456	59 33 12	2457
	Jupiter E.	99 47 27	2396	98 2 6	2392	96 16 39	2318	94 31 6	2315
	Regulus E.	100 34 8	2350	98 49 22	2346	97 4 30	2343	95 19 33	2339
21	Sun W.	60 46 6	2632	62 24 18	2622	64 2 34	2626	65 40 54	2624
	α Arietis W.	29 21 3	2776	30 56 2	2728	32 32 4	2688	34 9 0	2654
	Pollux E.	51 2 36	2473	49 20 45	2479	47 39 2	2487	45 57 30	2495
	Jupiter E.	85 42 12	2300	83 56 13	2298	82 10 11	2296	80 24 5	2294
	Regulus E.	86 33 33	2394	84 48 8	2392	83 2 40	2319	81 17 8	2317
22	Sun W.	73 53 15	2614	75 31 51	2619	77 10 29	2612	78 49 8	2611
	α Arietis W.	42 23 36	2535	44 4 0	2520	45 44 46	2505	47 25 52	2492
	Pollux E.	37 33 37	2567	35 53 56	2569	34 14 46	2515	32 36 12	2547
	Jupiter E.	71 33 3	2287	69 46 45	2287	68 0 26	2286	66 14 6	2285
	Regulus E.	72 28 51	2309	70 43 5	2308	68 57 18	2307	67 11 29	2306
23	Sun W.	87 2 44	2607	88 41 30	2607	90 20 16	2606	91 59 3	2606
	α Arietis W.	55 55 10	2448	57 37 37	2442	59 20 12	2436	61 2 55	2431
	Aldebaran W.	21 47 26	2296	23 33 31	2295	25 19 38	2294	27 5 46	2294
	Jupiter E.	57 22 19	2286	55 35 59	2287	53 49 40	2287	52 3 21	2286

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
10	Spica W.	82° 40' 35"	3057	84° 9' 37"	3059	85° 38' 45"	3047	87° 8' 0"	3040
	Antares W.	37 46 14	3198	39 12 25	3184	40 38 53	3171	42 5 37	3158
	SUN E.	66 0 48	3429	64 39 4	3423	63 17 13	3417	61 55 16	3410
11	Spica W.	94 36 16	3005	96 6 23	2997	97 36 40	2989	99 7 7	2979
	Antares W.	49 23 14	3094	50 51 31	3089	52 20 3	3069	53 48 50	3056
	SUN E.	55 3 27	3371	53 40 37	3369	52 17 37	3359	50 54 26	3344
12	Spica W.	106 42 18	2931	108 13 57	2921	109 45 49	2911	111 17 54	2900
	Antares W.	61 16 34	2995	62 46 53	2989	64 17 28	2979	65 48 18	2958
	SUN E.	43 55 39	3290	42 31 16	3278	41 6 39	3266	39 41 48	3255
13	Antares W.	73 26 28	2994	74 58 55	2981	76 31 38	2969	78 4 37	2955
	α Aquilæ W.	32 31 33	4716	33 32 19	4551	34 35 26	4404	35 40 44	4273
	SUN E.	32 34 3	3193	31 7 45	3180	29 41 12	3167	28 14 23	3154
14	Antares W.	85 53 41	2792	87 28 19	2780	89 3 13	2768	90 38 23	2756
	α Aquilæ W.	41 34 37	3779	42 50 1	3705	44 6 43	3637	45 24 37	3576
	SUN E.	20 56 25	3059	19 28 2	3076	17 59 21	3064	16 30 22	3051
18	SUN W.	28 22 2	2732	29 58 0	2724	31 34 8	2717	33 10 25	2710
	Aldebaran E.	41 21 22	2407	39 37 58	2401	37 54 25	2394	36 10 42	2389
	SATURN E.	51 14 17	2441	49 31 41	2435	47 48 56	2430	46 6 4	2425
	Pollux E.	85 1 55	2499	83 20 40	2493	81 39 17	2488	79 57 47	2483
19	SUN W.	41 14 1	2680	42 51 8	2675	44 28 22	2669	46 5 43	2664
	Aldebaran E.	27 30 4	2399	25 45 34	2357	24 0 57	2353	22 16 14	2349
	SATURN E.	37 30 7	2406	35 46 41	2403	34 3 11	2402	32 19 39	2401
	Pollux E.	71 28 37	2463	69 46 32	2461	68 4 24	2458	66 22 12	2457
	JUPITER E.	106 47 48	2344	105 2 53	2339	103 17 51	2335	101 32 42	2331
20	SUN W.	54 13 59	2644	55 51 54	2640	57 29 54	2638	59 7 58	2635
	SATURN E.	23 42 9	2413	21 58 53	2421	20 15 49	2433	18 33 1	2449
	Pollux E.	57 50 58	2458	56 8 46	2461	54 26 38	2464	52 44 34	2468
	JUPITER E.	92 45 28	2311	90 59 45	2309	89 13 58	2306	87 28 7	2303
	Regulus E.	93 34 30	2335	91 49 22	2333	90 4 10	2330	88 18 54	2326
21	SUN W.	67 19 17	2621	68 57 43	2620	70 36 11	2618	72 14 42	2616
	α Arietis W.	35 46 42	2623	37 25 5	2607	39 4 4	2673	40 43 36	2553
	Pollux E.	44 16 10	2505	42 35 4	2517	40 54 14	2531	39 13 44	2548
	JUPITER E.	78 37 57	2293	76 51 47	2291	75 5 35	2289	73 19 20	2288
	Regulus E.	79 31 34	2315	77 45 57	2313	76 0 17	2319	74 14 35	2311
22	SUN W.	80 27 48	2610	82 6 30	2608	83 45 14	2607	85 23 59	2607
	α Arietis W.	49 7 16	2482	50 48 55	2472	52 30 48	2463	54 12 53	2455
	Pollux E.	30 58 21	2684	29 21 20	2728	27 45 18	2782	26 10 26	2846
	JUPITER E.	64 27 45	2285	62 41 24	2285	60 55 2	2275	59 8 40	2285
	Regulus E.	65 25 39	2306	63 39 48	2305	61 53 56	2305	60 8 4	2305
23	SUN W.	93 37 50	2606	95 16 37	2607	96 55 23	2607	98 34 9	2607
	α Arietis W.	62 45 45	2427	64 28 41	2423	66 11 43	2420	67 54 49	2417
	Aldebaran W.	28 51 55	2294	30 38 4	2294	32 24 13	2294	34 10 21	2295
	JUPITER E.	50 17 4	2280	48 30 49	2291	46 44 37	2290	44 58 27	2295

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	Regulus	E.	58° 22' 12"	9305	56° 36' 20"	9305	54° 50' 28"	9306	53° 4' 37"	9306
	Spica	E.	111 51 35	9303	110 5 40	9303	108 19 44	9303	106 33 48	9303
24	SUN	W.	100 12 55	9307	101 51 40	9308	103 30 24	9309	105 9 7	9310
	α Arietis	W.	69 38 0	9414	71 21 14	9413	73 4 30	9413	74 47 48	9411
	Aldebaran	W.	35 56 28	9395	37 42 35	9395	39 28 41	9396	41 14 46	9397
	SATURN	W.	26 6 24	9363	27 50 52	9359	29 35 26	9355	31 20 6	9352
	JUPITER	E.	43 12 20	9396	41 26 17	9390	39 40 18	9384	37 54 24	9386
	Regulus	E.	44 15 38	9319	42 29 56	9314	40 44 17	9317	38 58 42	9319
	Spica	E.	97 44 4	9303	95 58 9	9304	94 12 15	9304	92 26 21	9305
25	SUN	W.	113 22 17	9318	115 0 48	9319	116 39 17	9321	118 17 43	9324
	α Arietis	W.	83 24 27	9411	85 7 46	9412	86 51 3	9414	88 34 17	9417
	Aldebaran	W.	50 4 48	9304	51 50 42	9306	53 36 33	9308	55 22 21	9310
	SATURN	W.	40 4 7	9347	41 48 58	9348	43 33 48	9348	45 18 37	9349
	JUPITER	E.	29 6 41	9339	27 21 38	9348	25 36 49	9350	23 52 16	9373
	Regulus	E.	30 11 53	9339	28 26 51	9346	26 41 58	9353	24 57 15	9361
	Spica	E.	83 37 19	9319	81 51 37	9314	80 5 58	9316	78 20 22	9319
26	SUN	W.	126 28 59	9339	128 7 1	9343	129 44 59	9346	131 22 52	9350
	Aldebaran	W.	64 10 29	9394	65 55 54	9397	67 41 14	9391	69 26 29	9394
	SATURN	W.	54 2 13	9359	55 46 47	9362	57 31 17	9365	59 15 42	9368
	Pollux	W.	23 34 36	9330	25 6 17	9359	26 39 29	9360	28 13 57	9753
	Spica	E.	69 33 20	9333	67 48 9	9337	66 3 3	9340	64 18 2	9345
	Antares	E.	115 2 12	9392	113 18 26	9394	111 34 42	9396	109 51 1	9398
27	Aldebaran	W.	78 11 16	9357	79 55 53	9362	81 40 23	9367	83 24 45	9373
	SATURN	W.	67 56 27	9369	69 40 17	9394	71 24 0	9400	73 7 35	9405
	Pollux	W.	36 18 34	9318	37 57 4	9303	39 35 55	9291	41 15 2	9282
	Spica	E.	55 34 38	9370	53 50 20	9375	52 6 10	9381	50 22 8	9387
	Antares	E.	101 13 37	9415	99 30 24	9420	97 47 18	9425	96 4 19	9430
28	Aldebaran	W.	92 4 24	9405	93 47 51	9419	95 31 8	9419	97 14 15	9427
	SATURN	W.	81 43 26	9437	83 26 8	9445	85 8 39	9453	86 50 59	9460
	Pollux	W.	49 32 57	9561	51 12 45	9561	52 52 33	9562	54 32 20	9564
	Spica	E.	41 44 27	9425	40 1 28	9434	38 18 42	9443	36 36 9	9453
	Antares	E.	87 31 26	9462	85 49 20	9470	84 7 24	9477	82 25 39	9486
29	SATURN	W.	95 19 50	9503	97 0 59	9512	98 41 55	9522	100 22 37	9532
	Pollux	W.	62 50 14	9585	64 29 30	9590	66 8 38	9597	67 47 37	9604
	JUPITER	W.	27 33 32	9507	29 14 36	9510	30 55 35	9515	32 36 27	9521
	Regulus	W.	25 56 15	9512	27 37 11	9517	25 15 0	9523	30 58 41	9529
	Antares	E.	73 59 50	9533	72 19 31	9543	70 39 18	9553	68 59 19	9565
30	Pollux	W.	75 59 52	9646	77 37 44	9657	79 15 22	9667	80 52 46	9677
	JUPITER	W.	40 58 32	9559	42 38 24	9567	44 18 4	9577	45 57 30	9587
	Regulus	W.	39 19 35	9571	40 59 10	9580	42 38 32	9589	44 17 40	9601
	Antares	E.	60 43 28	9697	59 5 10	9640	57 27 10	9656	55 49 30	9669
31	Pollux	W.	88 56 9	9734	90 32 4	9746	92 7 43	9759	93 43 5	9772
	JUPITER	W.	54 11 10	9641	55 49 9	9652	57 26 53	9664	59 4 21	9675
	Regulus	W.	52 29 43	9656	54 7 22	9667	55 44 46	9679	57 21 54	9691
	Antares	E.	47 46 15	9751	46 10 43	9769	44 35 34	9788	43 0 50	9808



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	Regulus	E.	51° 18' 47"	9307	49° 32' 56"	9308	47° 47' 10"	9309	46° 1' 23"	9310
	Spica	E.	104 47 51	9309	103 1 54	9309	101 15 57	9309	99 30 0	9309
24	SUN	W.	106 47 48	9611	108 26 28	9612	110 5 7	9614	111 43 43	9615
	α Arietis	W.	76 31 7	9410	78 14 27	9410	79 57 47	9410	81 41 7	9410
	Aldebaran	W.	43 0 50	9398	44 46 52	9399	46 32 53	9399	48 18 52	9399
	SATURN	W.	33 4 50	9350	34 49 37	9348	36 34 26	9348	38 19 16	9347
	JUPITER	E.	36 8 36	9313	34 22 55	9317	32 37 21	9324	30 51 56	9331
	Regulus	E.	37 13 10	9292	35 27 43	9295	33 42 20	9299	31 57 3	9294
	Spica	E.	90 40 29	9307	88 54 39	9307	87 8 50	9309	85 23 3	9311
25	SUN	W.	119 56 5	9626	121 34 24	9629	123 12 40	9632	124 50 52	9635
	α Arietis	W.	90 17 27	9419	92 0 34	9421	93 43 38	9425	95 26 37	9429
	Aldebaran	W.	57 8 6	9313	58 53 47	9315	60 30 25	9317	62 24 59	9320
	SATURN	W.	47 3 25	9350	48 48 11	9352	50 32 55	9354	52 17 36	9357
	JUPITER	E.	22 8 3	9390	20 24 14	9419	18 40 56	9440	16 58 18	9477
	Regulus	E.	23 12 44	9371	21 28 28	9384	19 44 31	9400	18 0 57	9421
	Spica	E.	76 34 50	9322	74 49 22	9324	73 3 57	9326	71 18 36	9330
26	SUN	W.	133 0 39	9655	134 38 20	9659	136 15 55	9663	137 53 24	9669
	Aldebaran	W.	71 11 39	9338	72 56 43	9343	74 41 40	9347	76 26 31	9351
	SATURN	W.	61 0 2	9372	62 44 17	9375	64 28 27	9380	66 12 30	9384
	Pollux	W.	29 49 27	9215	31 25 47	9233	33 2 50	9257	34 40 28	9286
	Spica	E.	62 33 8	9349	60 48 20	9354	59 3 39	9359	57 19 5	9364
	Antares	E.	108 7 23	9401	106 23 49	9404	104 40 20	9408	102 56 56	9411
27	Aldebaran	W.	85 8 59	9379	86 53 4	9385	88 37 0	9391	90 20 47	9398
	SATURN	W.	74 51 3	9411	76 34 22	9417	78 17 33	9424	80 0 34	9430
	Pollux	W.	42 54 22	9574	44 33 52	9569	46 13 29	9566	47 53 11	9563
	Spica	E.	48 38 15	9394	46 54 32	9402	45 11 0	9409	43 27 38	9417
	Antares	E.	94 21 27	9436	92 38 43	9442	90 56 8	9448	89 13 42	9455
28	Aldebaran	W.	98 57 11	9436	100 39 55	9444	102 22 27	9453	104 4 47	9462
	SATURN	W.	88 33 9	9467	90 15 8	9476	91 56 55	9485	93 38 29	9494
	Pollux	W.	56 12 4	9567	57 51 44	9570	59 31 20	9574	61 10 50	9579
	Spica	E.	34 53 49	9463	33 11 44	9475	31 29 55	9486	29 48 22	9499
	Antares	E.	80 44 6	9494	79 2 45	9503	77 21 36	9513	75 40 41	9522
29	SATURN	W.	102 3 6	9543	103 43 20	9553	105 23 20	9564	107 3 5	9574
	Pollux	W.	69 26 26	9619	71 5 5	9621	72 43 32	9629	74 21 48	9637
	JUPITER	W.	34 17 11	9527	35 57 46	9534	37 38 12	9541	39 18 28	9550
	Regulus	W.	32 39 14	9536	34 19 37	9545	35 59 48	9553	37 39 48	9562
	Antares	E.	67 19 36	9577	65 40 9	9588	64 0 58	9601	62 22 4	9614
30	Pollux	W.	82 29 56	9668	84 6 52	9669	85 43 33	9710	87 19 59	9722
	JUPITER	W.	47 36 43	9597	49 15 42	9608	50 54 26	9618	52 32 56	9630
	Regulus	W.	45 56 34	9619	47 35 13	9622	49 13 38	9633	50 51 48	9644
	Antares	E.	54 12 9	9684	52 35 8	9700	50 58 28	9716	49 22 10	9734
31	Pollux	W.	95 18 10	9784	96 52 59	9797	98 27 31	9810	100 1 46	9823
	JUPITER	W.	60 41 34	9627	62 18 31	9639	63 55 12	9711	65 31 37	9723
	Regulus	W.	58 58 46	9702	60 35 23	9715	62 11 43	9727	63 47 47	9739
	Antares	E.	41 26 32	9698	39 52 41	9690	38 19 18	9673	36 46 25	9666

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Subtracted from Apparent Time.			
Wed.	1	<sup>h</sup> 0 <sup>m</sup> 43 <sup>s</sup> 52.48	9.097	N. 4° 43' 7.4"	+57.73	16' 2.00"	<sup>s</sup> 64.51	<sup>m</sup> 3 49.70	<sup>s</sup> 0.758	
Thur.	2	0 47 30.87	9.102	5 6 10.2	57.51	16 1.72	64.53	3 31.59	0.752	
Frid.	3	0 51 9.37	9.109	5 29 7.5	57.28	16 1.44	64.55	3 13.60	0.746	
Sat.	4	0 54 48.07	9.116	5 51 59.3	+57.03	16 1.16	64.57	2 55.78	0.739	
SUN.	5	0 58 26.97	9.125	6 14 45.0	56.77	16 0.88	64.60	2 38.17	0.730	
Mon.	6	1 2 6.07	9.134	6 37 24.3	56.50	16 0.60	64.63	2 20.77	0.721	
Tues.	7	1 5 45.39	9.144	6 59 56.9	+56.21	16 0.32	64.66	2 3.59	0.711	
Wed.	8	1 9 24.95	9.154	7 22 22.6	55.91	16 0.04	64.70	1 46.65	0.701	
Thur.	9	1 13 4.78	9.165	7 44 40.8	55.60	15 59.76	64.74	1 29.97	0.690	
Frid.	10	1 16 44.90	9.177	8 6 51.3	+55.27	15 59.48	64.78	1 13.58	0.678	
Sat.	11	1 20 25.31	9.190	8 28 53.7	54.93	15 59.20	64.82	0 57.48	0.665	
SUN.	12	1 24 6.02	9.203	8 50 47.8	54.57	15 58.93	64.86	0 41.69	0.652	
Mon.	13	1 27 47.05	9.217	9 12 33.0	+54.20	15 58.66	64.91	0 26.21	0.638	
Tues.	14	1 31 28.42	9.231	9 34 9.1	53.81	15 58.39	64.96	0 11.07	0.624	
Wed.	15	1 35 10.14	9.245	9 55 35.8	53.41	15 58.12	65.01	0 3.73	0.610	
Thur.	16	1 38 52.21	9.260	10 16 52.6	+52.99	15 57.86	65.07	0 18.18	0.595	
Frid.	17	1 42 34.64	9.276	10 37 59.2	52.56	15 57.60	65.12	0 32.26	0.579	
Sat.	18	1 46 17.45	9.293	10 58 55.3	52.11	15 57.34	65.18	0 45.96	0.563	
SUN.	19	1 50 0.66	9.309	11 19 40.5	+51.65	15 57.08	65.24	0 59.27	0.547	
Mon.	20	1 53 44.27	9.326	11 40 14.6	51.17	15 56.83	65.30	1 12.18	0.530	
Tues.	21	1 57 28.29	9.343	12 0 37.0	50.68	15 56.58	65.36	1 24.68	0.513	
Wed.	22	2 1 12.73	9.361	12 20 47.6	+50.18	15 56.33	65.43	1 36.76	0.495	
Thur.	23	2 4 57.62	9.379	12 40 45.9	49.67	15 56.08	65.50	1 48.39	0.477	
Frid.	24	2 8 42.96	9.398	13 0 31.7	49.14	15 55.83	65.57	1 59.57	0.458	
Sat.	25	2 12 28.75	9.418	13 20 4.7	+48.60	15 55.58	65.64	2 10.30	0.438	
SUN.	26	2 16 15.01	9.438	13 39 24.5	48.04	15 55.34	65.71	2 20.56	0.418	
Mon.	27	2 20 1.76	9.459	13 58 30.8	47.48	15 55.10	65.78	2 30.34	0.397	
Tues.	28	2 23 49.02	9.480	14 17 23.3	+46.90	15 54.86	65.86	2 39.60	0.376	
Wed.	29	2 27 36.80	9.502	14 36 1.8	46.31	15 54.62	65.94	2 48.35	0.354	
Thur.	30	2 31 25.10	9.524	14 54 25.8	45.70	15 54.38	66.02	2 56.58	0.332	
Frid.	31	2 35 13.94	9.547	N. 15 12 35.1	+45.08	15 54.14	66.10	3 4.28	0.309	

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sideral time.  
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.		
Wed.	1	<sup>h</sup> 0 <sup>m</sup> 43 <sup>s</sup> 51.90	9.099	N. <sup>°</sup> 4 <sup>'</sup> 43 <sup>"</sup> 3.7	+57.74	<sup>m</sup> 3 <sup>s</sup> 49.75	0.758	<sup>h</sup> 0 <sup>m</sup> 40 <sup>s</sup> 2.15
Thur.	2	0 47 30.33	9.104	5 6 6.8	57.52	3 31.63	0.752	0 43 58.70
Frid.	3	0 51 8.89	9.111	5 29 4.5	57.29	3 13.64	0.746	0 47 55.25
Sat.	4	0 54 47.63	9.118	5 51 56.6	+57.04	2 55.82	0.739	0 51 51.81
SUN.	5	0 58 26.57	9.127	6 14 42.6	56.78	2 38.21	0.730	0 55 48.36
Mon.	6	1 2 5.72	9.136	6 37 22.2	56.51	2 20.81	0.721	0 59 44.91
Tues.	7	1 5 45.08	9.146	6 59 55.1	+56.22	2 3.62	0.711	1 3 41.46
Wed.	8	1 9 24.68	9.156	7 22 21.0	55.92	1 46.67	0.701	1 7 38.01
Thur.	9	1 13 4.55	9.167	7 44 39.5	55.61	1 29.99	0.690	1 11 34.56
Frid.	10	1 16 44.71	9.179	8 6 50.2	+55.28	1 13.60	0.678	1 15 31.11
Sat.	11	1 20 25.16	9.192	8 28 52.9	54.94	0 57.49	0.665	1 19 27.67
SUN.	12	1 24 5.91	9.205	8 50 47.2	54.58	0 41.69	0.652	1 23 24.22
Mon.	13	1 27 46.98	9.219	9 12 32.6	+54.21	0 26.21	0.638	1 27 20.77
Tues.	14	1 31 28.39	9.233	9 34 8.9	53.82	0 11.07	0.624	1 31 17.32
Wed.	15	1 35 10.15	9.247	9 55 35.8	53.42	0 3.73	0.610	1 35 13.88
Thur.	16	1 38 52.26	9.262	10 16 52.8	+53.00	0 18.18	0.595	1 39 10.44
Frid.	17	1 42 34.73	9.278	10 37 59.6	52.57	0 32.26	0.579	1 43 6.99
Sat.	18	1 46 17.58	9.294	10 58 55.9	52.12	0 45.96	0.563	1 47 3.54
SUN.	19	1 50 0.82	9.310	11 19 41.3	+51.66	0 59.28	0.547	1 51 0.10
Mon.	20	1 53 44.46	9.327	11 40 15.6	51.18	1 12.19	0.530	1 54 56.65
Tues.	21	1 57 28.51	9.344	12 0 38.2	50.69	1 24.69	0.513	1 58 53.20
Wed.	22	2 1 12.98	9.362	12 20 48.9	+50.19	1 36.77	0.495	2 2 49.75
Thur.	23	2 4 57.90	9.380	12 40 47.4	49.68	1 48.40	0.477	2 6 46.30
Frid.	24	2 8 43.27	9.399	13 0 33.3	49.15	1 59.58	0.458	2 10 42.85
Sat.	25	2 12 29.09	9.419	13 20 6.4	+48.61	2 10.33	0.438	2 14 39.41
SUN.	26	2 16 15.38	9.439	13 39 26.4	48.05	2 20.58	0.418	2 18 35.96
Mon.	27	2 20 2.16	9.460	13 58 32.8	47.48	2 30.36	0.397	2 22 32.52
Tues.	28	2 23 49.45	9.481	14 17 25.4	+46.90	2 39.62	0.376	2 26 29.07
Wed.	29	2 27 37.25	9.503	14 36 4.0	46.31	2 48.37	0.354	2 30 25.62
Thur.	30	2 31 25.57	9.525	14 54 28.1	45.70	2 56.60	0.332	2 34 22.17
Frid.	31	2 35 14.43	9.548	N. 15 12 37.5	+45.08	3 4.30	0.309	2 38 18.73

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,  
+ 9".8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	91	11° 55' 56.0	55° 42.6	147.76	+ 0.22	9.9999987	+ 52.5	23 <sup>h</sup> 16 <sup>m</sup> 8.50 <sup>s</sup>
2	92	12 55 1.3	54 47.8	147.68	0.35	0.0001251	52.7	23 12 12.59
3	93	13 54 4.8	53 51.2	147.60	0.46	0.0002520	52.9	23 8 16.68
4	94	14 53 6.4	52 52.7	147.52	+ 0.52	0.0003791	+ 53.0	23 4 20.78
5	95	15 52 6.2	51 52.5	147.45	0.56	0.0005063	53.0	23 0 24.88
6	96	16 51 4.2	50 50.4	147.38	0.58	0.0006335	53.0	22 56 28.97
7	97	17 50 0.5	49 46.6	147.31	+ 0.58	0.0007607	+ 52.9	22 52 33.06
8	98	18 48 55.0	48 41.0	147.24	0.55	0.0008876	52.8	22 48 37.16
9	99	19 47 47.8	47 33.7	147.17	0.47	0.0010140	52.5	22 44 41.26
10	100	20 46 38.9	46 24.7	147.09	+ 0.38	0.0011397	+ 52.2	22 40 45.35
11	101	21 45 28.2	45 13.9	147.02	0.26	0.0012647	51.9	22 36 49.44
12	102	22 44 15.7	44 1.3	146.94	0.14	0.0013887	51.5	22 32 53.54
13	103	23 43 1.3	42 46.9	146.86	+ 0.02	0.0015117	+ 51.1	22 28 57.63
14	104	24 41 45.0	41 30.5	146.78	- 0.11	0.0016337	50.6	22 25 1.72
15	105	25 40 26.8	40 12.2	146.70	0.24	0.0017545	50.1	22 21 5.81
16	106	26 39 6.5	38 51.8	146.61	- 0.34	0.0018741	+ 49.6	22 17 9.90
17	107	27 37 44.2	37 29.4	146.53	0.43	0.0019925	49.1	22 13 14.00
18	108	28 36 19.8	36 4.9	146.44	0.49	0.0021098	48.6	22 9 18.09
19	109	29 34 53.2	34 38.2	146.35	- 0.51	0.0022260	+ 48.2	22 5 22.18
20	110	30 33 24.5	33 9.4	146.26	0.51	0.0023411	47.8	22 1 26.27
21	111	31 31 53.7	31 38.5	146.17	0.47	0.0024552	47.4	21 57 30.37
22	112	32 30 20.7	30 5.4	146.08	- 0.42	0.0025685	+ 47.0	21 53 34.46
23	113	33 28 45.5	28 30.1	145.99	0.32	0.0026810	46.7	21 49 38.55
24	114	34 27 8.2	26 52.7	145.90	0.22	0.0027928	46.4	21 45 42.64
25	115	35 25 28.9	25 13.3	145.81	- 0.09	0.0029041	+ 46.2	21 41 46.74
26	116	36 23 47.5	23 31.8	145.73	+ 0.05	0.0030149	46.0	21 37 50.83
27	117	37 22 4.1	21 48.3	145.65	0.19	0.0031252	45.9	21 33 54.92
28	118	38 20 18.8	20 2.9	145.57	+ 0.32	0.0032351	+ 45.7	21 29 59.01
29	119	39 18 31.7	18 15.6	145.50	0.45	0.0033446	45.6	21 26 3.12
30	120	40 16 42.8	16 26.6	145.43	0.54	0.0034537	45.4	21 22 7.21
31	121	41 14 52.2	14 35.9	145.36	+ 0.62	0.0035623	+ 45.2	21 18 11.30
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> .0.								
								Diff. for 1 Hour, — 9 <sup>h</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

THE MOON'S									
Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	15' 19.4	15' 14.5	56' 7.3	- 1.50	55' 49.5	- 1.46	<sup>h</sup> 13 <sup>m</sup> 55.9	1.99	<sup>d</sup> 15.8
2	15 9.9	15 5.5	55 32.4	1.38	55 16.3	1.29	14 43.7	1.99	16.8
3	15 1.5	14 57.9	55 1.5	1.17	54 48.3	1.01	15 31.5	1.99	17.8
4	14 54.8	14 52.3	54 37.0	- 0.87	54 27.7	- 0.68	16 19.2	1.99	18.8
5	14 50.3	14 49.0	54 20.6	0.49	54 15.8	- 0.39	17 6.8	1.98	19.8
6	14 48.4	14 48.5	54 13.6	- 0.07	54 13.9	+ 0.14	17 54.1	1.96	20.8
7	14 49.3	14 50.8	54 16.9	+ 0.35	54 22.4	+ 0.57	18 40.9	1.94	21.8
8	14 53.0	14 56.0	54 30.6	0.78	54 41.3	0.99	19 27.4	1.93	22.8
9	14 59.5	15 3.7	54 54.3	1.17	55 9.6	1.35	20 13.7	1.93	23.8
10	15 8.4	15 13.6	55 26.9	+ 1.52	55 46.0	+ 1.65	21 0.1	1.94	24.8
11	15 19.2	15 25.1	56 6.5	1.76	56 28.2	1.84	21 46.9	1.97	25.8
12	15 31.2	15 37.3	56 50.6	1.88	57 13.3	1.89	22 34.9	2.03	26.8
13	15 43.5	15 49.5	57 36.0	+ 1.86	57 58.0	+ 1.79	23 24.6	2.11	27.8
14	15 55.2	16 0.5	58 18.9	1.68	58 38.3	1.54	<sup>h</sup> 0		28.8
15	16 5.3	16 9.5	58 55.9	1.37	59 11.3	1.17	0 16.3	2.21	0.3
16	16 13.0	16 15.7	59 24.1	+ 0.96	59 34.3	+ 0.73	1 10.4	2.31	1.3
17	16 17.8	16 19.0	59 41.7	0.50	59 46.3	+ 0.27	2 7.0	2.40	2.3
18	16 19.5	16 19.4	59 48.3	+ 0.06	59 47.6	- 0.15	3 5.3	2.45	3.3
19	16 18.5	16 17.2	59 44.6	- 0.34	59 39.5	- 0.50	4 4.4	2.46	4.3
20	16 15.3	16 13.0	59 32.6	0.64	59 24.1	0.77	5 3.0	2.41	5.3
21	16 10.3	16 7.3	59 14.2	0.87	59 3.2	0.96	6 0.0	2.33	6.3
22	16 4.1	16 0.7	58 51.4	- 1.02	58 39.0	- 1.06	6 54.8	2.23	7.3
23	15 57.1	15 53.4	58 25.9	1.10	58 12.4	1.13	7 47.3	2.14	8.3
24	15 49.7	15 45.8	57 58.6	1.16	57 44.5	1.18	8 37.6	2.06	9.3
25	15 41.9	15 37.9	57 30.1	- 1.21	57 15.5	- 1.22	9 26.4	2.01	10.3
26	15 33.9	15 29.9	57 0.8	1.23	56 45.9	1.24	10 14.2	1.98	11.3
27	15 25.8	15 21.8	56 31.0	1.24	56 16.1	1.24	11 1.5	1.97	12.3
28	15 17.7	15 13.7	56 1.2	- 1.23	55 46.6	- 1.20	11 48.8	1.98	13.3
29	15 9.9	15 6.1	55 32.4	1.16	55 18.7	1.12	12 36.3	1.99	14.3
30	15 2.6	14 59.3	55 5.6	1.06	54 53.4	0.97	13 24.2	2.00	15.3
31	14 56.2	14 53.5	54 42.3	- 0.87	54 32.4	- 0.76	14 12.2	2.00	16.3

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 1.					FRIDAY 3.				
0	14 9 5.55	2.0017	S. 10° 19' 22.6"	2.308	0	15 49 28.35	2.0093	S. 15° 41' 48.2"	2.984
1	14 11 11.05	2.0016	10 27 39.4	2.351	1	15 51 33.89	2.0093	15 46 43.7	2.985
2	14 13 16.54	2.0014	10 35 52.7	2.198	2	15 53 39.43	2.0093	15 51 34.4	2.906
3	14 15 22.02	2.0013	10 44 2.4	2.139	3	15 55 44.97	2.0093	15 56 20.4	2.797
4	14 17 27.49	2.0012	10 52 8.5	2.079	4	15 57 50.51	2.0093	16 1 1.6	2.647
5	14 19 32.96	2.0011	11 0 11.0	2.011	5	15 59 56.05	2.0094	16 5 38.1	2.568
6	14 21 38.42	2.0010	11 8 9.8	2.949	6	16 2 1.60	2.0094	16 10 9.8	2.488
7	14 23 43.88	2.0009	11 16 4.9	2.887	7	16 4 7.14	2.0093	16 14 36.7	2.408
8	14 25 49.33	2.0008	11 23 56.3	2.825	8	16 6 12.68	2.0094	16 18 58.8	2.327
9	14 27 54.78	2.0008	11 31 43.9	2.762	9	16 8 18.23	2.0095	16 23 16.0	2.247
10	14 30 0.23	2.0008	11 39 27.7	2.699	10	16 10 23.78	2.0094	16 27 28.4	2.167
11	14 32 5.68	2.0007	11 47 7.7	2.634	11	16 12 29.32	2.0093	16 31 36.0	2.086
12	14 34 11.12	2.0007	11 54 43.8	2.569	12	16 14 34.86	2.0093	16 35 38.7	2.004
13	14 36 16.56	2.0007	12 2 16.0	2.504	13	16 16 40.40	2.0093	16 39 36.5	2.923
14	14 38 22.00	2.0007	12 9 44.3	2.439	14	16 18 45.94	2.0093	16 43 29.4	2.842
15	14 40 27.44	2.0007	12 17 8.7	2.373	15	16 20 51.47	2.0093	16 47 17.5	2.761
16	14 42 32.88	2.0007	12 24 29.1	2.307	16	16 22 57.00	2.0093	16 51 0.7	2.678
17	14 44 38.32	2.0007	12 31 45.5	2.239	17	16 25 2.53	2.0091	16 54 38.9	2.596
18	14 46 43.76	2.0007	12 38 57.8	2.172	18	16 27 8.05	2.0090	16 58 12.2	2.514
19	14 48 49.20	2.0007	12 46 6.1	2.104	19	16 29 13.57	2.0019	17 1 40.6	2.432
20	14 50 54.64	2.0007	12 53 10.3	2.035	20	16 31 19.08	2.0018	17 5 4.0	2.349
21	14 53 0.09	2.0008	13 0 10.3	2.968	21	16 33 24.59	2.0017	17 8 22.5	2.267
22	14 55 5.54	2.0008	13 7 6.2	2.897	22	16 35 30.09	2.0017	17 11 36.0	2.184
23	14 57 10.99	2.0008	S. 13 13 57.9	2.827	23	16 37 35.59	2.0016	S. 17 14 44.6	2.102
THURSDAY 2.					SATURDAY 4.				
0	14 59 16.44	2.0009	S. 13 20 45.5	2.757	0	16 39 41.08	2.0014	S. 17 17 48.2	2.018
1	15 1 21.90	2.0010	13 27 28.8	2.687	1	16 41 46.56	2.0012	17 20 46.8	2.935
2	15 3 27.36	2.0010	13 34 7.9	2.616	2	16 43 52.03	2.0011	17 23 40.4	2.852
3	15 5 32.82	2.0010	13 40 42.7	2.544	3	16 45 57.49	2.0009	17 26 29.0	2.768
4	15 7 38.28	2.0011	13 47 13.2	2.472	4	16 48 2.94	2.0008	17 29 12.6	2.685
5	15 9 43.75	2.0012	13 53 39.4	2.401	5	16 50 8.38	2.0007	17 31 51.2	2.601
6	15 11 49.22	2.0012	14 0 1.3	2.329	6	16 52 13.82	2.0005	17 34 24.8	2.517
7	15 13 54.70	2.0013	14 6 18.8	2.255	7	16 54 19.24	2.0003	17 36 53.3	2.433
8	15 16 0.18	2.0013	14 12 31.9	2.182	8	16 56 24.65	2.0001	17 39 16.8	2.350
9	15 18 5.66	2.0014	14 18 40.6	2.108	9	16 58 30.05	2.0000	17 41 35.3	2.267
10	15 20 11.15	2.0015	14 24 44.9	2.034	10	17 0 35.43	2.0000	17 43 48.8	2.183
11	15 22 16.64	2.0015	14 30 44.7	2.960	11	17 2 40.80	2.0004	17 45 57.2	2.098
12	15 24 22.13	2.0016	14 36 40.1	2.886	12	17 4 46.16	2.0002	17 48 0.6	2.014
13	15 26 27.63	2.0017	14 42 31.0	2.810	13	17 6 51.50	2.0000	17 49 58.9	1.930
14	15 28 33.13	2.0017	14 48 17.3	2.734	14	17 8 56.83	2.0000	17 51 52.2	1.847
15	15 30 38.64	2.0018	14 53 59.1	2.658	15	17 11 2.14	2.0003	17 53 40.5	1.762
16	15 32 44.15	2.0018	14 59 36.3	2.582	16	17 13 7.43	2.0000	17 55 23.7	1.677
17	15 34 49.66	2.0019	15 5 9.0	2.507	17	17 15 12.70	2.0007	17 57 1.8	1.593
18	15 36 55.18	2.0020	15 10 37.1	2.430	18	17 17 17.96	2.0005	17 58 34.9	1.509
19	15 39 0.70	2.0020	15 16 0.6	2.352	19	17 19 23.20	2.0002	18 0 2.9	1.424
20	15 41 6.22	2.0021	15 21 19.4	2.275	20	17 21 28.42	2.0000	18 1 25.8	1.340
21	15 43 11.75	2.0022	15 26 33.6	2.197	21	17 23 33.62	2.0000	18 2 43.7	1.256
22	15 45 17.28	2.0022	15 31 43.1	2.120	22	17 25 38.80	2.0000	18 3 56.5	1.172
23	15 47 22.81	2.0023	15 36 48.0	2.042	23	17 27 43.96	2.0000	18 5 4.3	1.087
24	15 49 28.35	2.0023	S. 15 41 48.2	2.964	24	17 29 49.10	2.0000	S. 18 6 7.0	1.002

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 5.					TUESDAY 7.				
0	17 29 49.10	2.0855	S. 18° 6' 7.0"	1.009	0	19 9 20.25	2.0588	S. 17° 18' 4.2"	2.264
1	17 31 54.22	2.0851	18 7 4.6	0.918	1	19 11 23.76	2.0581	17 15 4.0	2.043
2	17 33 59.31	2.0847	18 7 57.2	0.834	2	19 13 27.22	2.0574	17 11 59.0	3.192
3	17 36 4.38	2.0843	18 8 44.7	0.750	3	19 15 30.64	2.0567	17 8 49.3	3.901
4	17 38 9.42	2.0839	18 9 27.2	0.666	4	19 17 34.02	2.0560	17 5 34.9	3.960
5	17 40 14.44	2.0835	18 10 4.6	0.581	5	19 19 37.36	2.0554	17 2 15.7	3.350
6	17 42 19.44	2.0831	18 10 36.9	0.497	6	19 21 40.67	2.0548	16 58 51.8	3.437
7	17 44 24.41	2.0826	18 11 4.2	0.412	7	19 23 43.94	2.0541	16 55 23.2	3.515
8	17 46 29.35	2.0822	18 11 26.4	0.327	8	19 25 47.16	2.0534	16 51 50.0	3.592
9	17 48 34.27	2.0817	18 11 43.5	0.243	9	19 27 50.34	2.0527	16 48 12.1	3.670
10	17 50 39.16	2.0812	18 11 55.6	0.160	10	19 29 53.48	2.0521	16 44 29.6	3.748
11	17 52 44.02	2.0808	18 12 2.7	- 0.076	11	19 31 56.59	2.0515	16 40 42.4	3.826
12	17 54 48.86	2.0804	18 12 4.7	+ 0.008	12	19 33 59.66	2.0508	16 36 50.5	3.903
13	17 56 53.67	2.0799	18 12 1.7	0.093	13	19 36 2.69	2.0502	16 32 54.0	3.979
14	17 58 58.45	2.0794	18 11 53.6	0.177	14	19 38 5.68	2.0495	16 28 53.0	4.055
15	18 1 3.20	2.0788	18 11 40.5	0.260	15	19 40 8.63	2.0488	16 24 47.4	4.132
16	18 3 7.91	2.0782	18 11 22.4	0.343	16	19 42 11.54	2.0482	16 20 37.2	4.208
17	18 5 12.59	2.0777	18 10 59.3	0.427	17	19 44 14.42	2.0476	16 16 22.5	4.283
18	18 7 17.24	2.0772	18 10 31.1	0.511	18	19 46 17.26	2.0470	16 12 3.3	4.358
19	18 9 21.86	2.0767	18 9 57.9	0.595	19	19 48 20.06	2.0463	16 7 39.5	4.434
20	18 11 26.45	2.0762	18 9 19.7	0.678	20	19 50 22.82	2.0457	16 3 11.2	4.509
21	18 13 31.00	2.0756	18 8 36.5	0.762	21	19 52 25.55	2.0450	15 58 38.4	4.583
22	18 15 35.52	2.0751	18 7 48.3	0.845	22	19 54 28.24	2.0444	15 54 1.2	4.658
23	18 17 40.01	2.0745	S. 18° 6' 55.1"	0.928	23	19 56 30.90	2.0441	S. 15° 49' 19.5"	4.733
MONDAY 6.					WEDNESDAY 8.				
0	18 19 44.47	2.0740	S. 18° 5' 56.9"	1.012	0	19 58 33.53	2.0435	S. 15° 44' 33.3"	4.807
1	18 21 48.89	2.0734	18 4 53.7	1.094	1	20 0 36.12	2.0429	15 39 42.7	4.880
2	18 23 53.28	2.0728	18 3 45.6	1.177	2	20 2 38.68	2.0423	15 34 47.7	4.953
3	18 25 57.63	2.0722	18 2 32.5	1.260	3	20 4 41.20	2.0417	15 29 48.3	5.027
4	18 28 1.94	2.0716	18 1 14.4	1.342	4	20 6 43.69	2.0411	15 24 44.5	5.099
5	18 30 6.22	2.0710	17 59 51.4	1.424	5	20 8 46.15	2.0407	15 19 36.4	5.172
6	18 32 10.46	2.0703	17 58 23.5	1.507	6	20 10 48.57	2.0401	15 14 23.9	5.244
7	18 34 14.66	2.0697	17 56 50.6	1.589	7	20 12 50.96	2.0396	15 9 7.1	5.316
8	18 36 18.83	2.0691	17 55 12.8	1.671	8	20 14 53.33	2.0392	15 3 46.0	5.387
9	18 38 22.96	2.0685	17 53 30.1	1.753	9	20 16 55.67	2.0387	14 58 20.6	5.459
10	18 40 27.05	2.0678	17 51 42.4	1.836	10	20 18 57.98	2.0382	14 52 50.9	5.531
11	18 42 31.10	2.0672	17 49 49.8	1.918	11	20 21 0.26	2.0377	14 47 16.9	5.602
12	18 44 35.12	2.0666	17 47 52.3	1.999	12	20 23 2.51	2.0373	14 41 38.6	5.673
13	18 46 39.10	2.0660	17 45 49.9	2.080	13	20 25 4.74	2.0369	14 35 56.1	5.743
14	18 48 43.04	2.0653	17 43 42.7	2.161	14	20 27 6.94	2.0364	14 30 9.5	5.812
15	18 50 46.94	2.0647	17 41 30.6	2.242	15	20 29 9.11	2.0360	14 24 18.7	5.882
16	18 52 50.80	2.0640	17 39 13.6	2.323	16	20 31 11.26	2.0356	14 18 23.7	5.951
17	18 54 54.62	2.0633	17 36 51.8	2.403	17	20 33 13.39	2.0352	14 12 24.6	6.020
18	18 56 58.40	2.0627	17 34 25.2	2.484	18	20 35 15.49	2.0348	14 6 21.3	6.089
19	18 59 2.14	2.0620	17 31 53.7	2.565	19	20 37 17.57	2.0345	14 0 13.9	6.157
20	19 1 5.84	2.0613	17 29 17.4	2.645	20	20 39 19.63	2.0342	13 54 2.5	6.224
21	19 3 9.50	2.0607	17 26 36.3	2.725	21	20 41 21.67	2.0339	13 47 47.0	6.292
22	19 5 13.12	2.0600	17 23 50.4	2.805	22	20 43 23.70	2.0336	13 41 27.4	6.360
23	19 7 16.70	2.0594	17 20 59.7	2.885	23	20 45 25.71	2.0333	13 35 3.8	6.427
24	19 9 20.25	2.0588	S. 17° 18' 4.2"	2.964	24	20 47 27.70	2.0331	S. 13° 28' 36.2"	6.493

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 9.					SATURDAY 11.				
0	<sup>h</sup> 20 <sup>m</sup> 47 <sup>s</sup> 27.70	2.0331	S. 13° 28' 36.2"	6.403	0	<sup>h</sup> 22 <sup>m</sup> 25 <sup>s</sup> 8.26	2.0405	S. 7° 7' 52.4"	9.195
1	20 49 29.68	2.0328	13 22 4.6	6.559	1	22 27 11.08	2.0475	6 58 39.4	9.328
2	20 51 31.64	2.0325	13 15 29.1	6.695	2	22 29 13.96	2.0485	6 49 23.8	9.381
3	20 53 33.58	2.0322	13 8 49.6	6.801	3	22 31 16.90	2.0495	6 40 5.6	9.394
4	20 55 35.51	2.0321	13 2 6.2	6.756	4	22 33 19.90	2.0506	6 30 44.9	9.388
5	20 57 37.43	2.0320	12 55 18.9	6.821	5	22 35 22.97	2.0517	6 21 21.7	9.406
6	20 59 39.35	2.0318	12 48 27.7	6.885	6	22 37 26.10	2.0528	6 11 56.0	9.449
7	21 1 41.25	2.0316	12 41 32.7	6.948	7	22 39 29.30	2.0539	6 2 27.8	9.489
8	21 3 43.14	2.0315	12 34 33.9	7.012	8	22 41 32.57	2.0551	5 52 57.3	9.528
9	21 5 45.03	2.0314	12 27 31.2	7.076	9	22 43 35.91	2.0563	5 43 24.4	9.567
10	21 7 46.91	2.0313	12 20 24.8	7.139	10	22 45 39.33	2.0576	5 33 49.2	9.606
11	21 9 48.79	2.0312	12 13 14.6	7.203	11	22 47 42.82	2.0589	5 24 11.7	9.644
12	21 11 50.66	2.0312	12 6 0.6	7.264	12	22 49 46.39	2.0602	5 14 31.9	9.682
13	21 13 52.53	2.0312	11 58 42.9	7.325	13	22 51 50.04	2.0615	5 4 49.9	9.718
14	21 15 54.40	2.0312	11 51 21.6	7.386	14	22 53 53.77	2.0629	4 55 5.8	9.753
15	21 17 56.28	2.0312	11 43 56.6	7.447	15	22 55 57.59	2.0644	4 45 19.6	9.788
16	21 19 58.15	2.0312	11 36 28.0	7.508	16	22 58 1.50	2.0659	4 35 31.3	9.822
17	21 22 0.03	2.0313	11 28 55.7	7.568	17	23 0 5.50	2.0673	4 25 41.0	9.856
18	21 24 1.91	2.0314	11 21 19.8	7.627	18	23 2 9.58	2.0688	4 15 48.6	9.890
19	21 26 3.80	2.0316	11 13 40.4	7.686	19	23 4 13.76	2.0704	4 5 54.3	9.921
20	21 28 5.70	2.0317	11 5 57.5	7.745	20	23 6 18.03	2.0720	3 55 58.1	9.956
21	21 30 7.60	2.0318	10 58 11.0	7.803	21	23 8 22.40	2.0737	3 46 0.0	9.983
22	21 32 9.51	2.0320	10 50 21.1	7.861	22	23 10 26.87	2.0753	3 36 0.1	10.013
23	21 34 11.44	2.0322	S. 10 42 27.7	7.919	23	23 12 31.44	2.0770	S. 3 25 58.5	10.042
FRIDAY 10.					SUNDAY 12.				
0	21 36 13.38	2.0325	S. 10 34 30.8	7.977	0	23 14 36.11	2.0786	S. 3 15 55.1	10.071
1	21 38 15.34	2.0327	10 26 30.5	8.033	1	23 16 40.89	2.0805	3 5 50.0	10.098
2	21 40 17.31	2.0330	10 18 26.9	8.088	2	23 18 45.78	2.0823	2 55 43.3	10.125
3	21 42 19.30	2.0333	10 10 19.9	8.144	3	23 20 50.77	2.0842	2 45 35.0	10.152
4	21 44 21.31	2.0337	10 2 9.6	8.199	4	23 22 55.88	2.0861	2 35 25.1	10.177
5	21 46 23.34	2.0341	9 53 56.0	8.253	5	23 25 1.10	2.0880	2 25 13.7	10.202
6	21 48 25.40	2.0345	9 45 39.2	8.308	6	23 27 6.44	2.0900	2 15 0.9	10.226
7	21 50 27.48	2.0349	9 37 19.1	8.362	7	23 29 11.90	2.0920	2 4 46.7	10.248
8	21 52 29.59	2.0353	9 28 55.8	8.415	8	23 31 17.48	2.0940	1 54 31.1	10.271
9	21 54 31.72	2.0358	9 20 29.3	8.467	9	23 33 23.18	2.0961	1 44 14.2	10.292
10	21 56 33.88	2.0363	9 11 59.7	8.519	10	23 35 29.01	2.0982	1 33 56.0	10.313
11	21 58 36.08	2.0369	9 3 27.0	8.571	11	23 37 34.96	2.1003	1 23 36.7	10.333
12	22 0 38.31	2.0374	8 54 51.2	8.622	12	23 39 41.04	2.1024	1 13 16.2	10.351
13	22 2 40.57	2.0380	8 46 12.4	8.673	13	23 41 47.25	2.1046	1 2 54.6	10.369
14	22 4 42.87	2.0387	8 37 30.5	8.723	14	23 43 53.60	2.1069	0 52 31.9	10.387
15	22 6 45.21	2.0393	8 28 45.6	8.772	15	23 46 0.08	2.1092	0 42 8.2	10.403
16	22 8 47.59	2.0400	8 19 57.8	8.822	16	23 48 6.70	2.1115	0 31 43.6	10.418
17	22 10 50.01	2.0407	8 11 7.0	8.871	17	23 50 13.46	2.1138	0 21 18.1	10.432
18	22 12 52.47	2.0414	8 2 13.3	8.918	18	23 52 20.36	2.1162	0 10 51.8	10.445
19	22 14 54.98	2.0421	7 53 16.8	8.965	19	23 54 27.40	2.1186	S. 0 0 24.7	10.458
20	22 16 57.53	2.0429	7 44 17.5	9.011	20	23 56 34.59	2.1211	N. 0 10 3.2	10.470
21	22 19 0.13	2.0438	7 35 15.4	9.058	21	23 58 41.93	2.1236	0 20 31.7	10.480
22	22 21 2.79	2.0447	7 26 10.5	9.105	22	0 0 49.42	2.1261	0 31 0.8	10.490
23	22 23 5.50	2.0456	7 17 2.8	9.151	23	0 2 57.06	2.1287	0 41 30.5	10.500
24	22 25 8.26	2.0465	S. 7 7 52.4	9.195	24	0 5 4.86	2.1312	N. 0 52 0.8	10.508



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 13.					WEDNESDAY 15.				
0	0 5 4.86	2.1312	N. 0 52' 0.8"	10.508	0	1 50 57.33	2.2901	N. 9 5' 52.2"	9.640
1	0 7 12.81	2.1338	1 2 31.5	10.515	1	1 53 14.85	2.2930	9 15 29.2	9.599
2	0 9 20.92	2.1365	1 13 2.6	10.521	2	1 55 32.60	2.2978	9 25 3.3	9.544
3	0 11 29.19	2.1399	1 23 34.0	10.526	3	1 57 50.58	2.3017	9 34 34.5	9.496
4	0 13 37.62	2.1419	1 34 5.7	10.530	4	2 0 8.80	2.3055	9 44 2.8	9.446
5	0 15 46.22	2.1447	1 44 37.6	10.533	5	2 2 27.24	2.3093	9 53 28.0	9.393
6	0 17 54.99	2.1475	1 55 9.7	10.536	6	2 4 45.91	2.3131	10 2 50.0	9.340
7	0 20 3.92	2.1503	2 5 41.9	10.537	7	2 7 4.81	2.3170	10 12 8.8	9.287
8	0 22 13.02	2.1539	2 16 14.1	10.537	8	2 9 23.95	2.3209	10 21 24.4	9.233
9	0 24 22.30	2.1561	2 26 46.3	10.536	9	2 11 43.32	2.3247	10 30 36.6	9.175
10	0 26 31.75	2.1590	2 37 18.4	10.534	10	2 14 2.92	2.3286	10 39 45.4	9.117
11	0 28 41.38	2.1620	2 47 50.4	10.531	11	2 16 22.75	2.3324	10 48 50.7	9.058
12	0 30 51.19	2.1650	2 58 22.1	10.527	12	2 18 42.81	2.3362	10 57 52.4	8.996
13	0 33 1.18	2.1680	3 8 53.6	10.522	13	2 21 3.10	2.3401	11 6 50.4	8.937
14	0 35 11.35	2.1710	3 19 24.8	10.516	14	2 23 23.62	2.3440	11 15 44.8	8.875
15	0 37 21.70	2.1741	3 29 55.5	10.509	15	2 25 44.38	2.3479	11 24 35.4	8.811
16	0 39 32.24	2.1772	3 40 25.8	10.501	16	2 28 5.37	2.3517	11 33 22.1	8.745
17	0 41 42.97	2.1803	3 50 55.6	10.493	17	2 30 26.59	2.3555	11 42 4.8	8.678
18	0 43 53.88	2.1835	4 1 24.9	10.483	18	2 32 48.03	2.3593	11 50 43.5	8.611
19	0 46 4.99	2.1867	4 11 53.5	10.471	19	2 35 9.70	2.3631	11 59 18.1	8.549
20	0 48 16.29	2.1900	4 22 21.4	10.457	20	2 37 31.60	2.3669	12 7 48.6	8.479
21	0 50 27.79	2.1932	4 32 48.4	10.443	21	2 39 53.73	2.3706	12 16 14.8	8.401
22	0 52 39.48	2.1965	4 43 14.6	10.429	22	2 42 16.09	2.3744	12 24 36.7	8.329
23	0 54 51.37	2.1998	N. 4 53 39.9	10.413	23	2 44 38.68	2.3783	N. 12 32 54.3	8.256
TUESDAY 14.					THURSDAY 16.				
0	0 57 3.46	2.2032	N. 5 4 4.2	10.397	0	2 47 1.49	2.3820	N. 12 41 7.4	8.181
1	0 59 15.75	2.2066	5 14 27.5	10.379	1	2 49 24.52	2.3857	12 49 16.0	8.105
2	1 1 28.25	2.2100	5 24 49.7	10.359	2	2 51 47.78	2.3895	12 57 20.0	8.027
3	1 3 40.95	2.2134	5 35 10.6	10.338	3	2 54 11.26	2.3932	13 5 19.3	7.949
4	1 5 53.86	2.2168	5 45 30.3	10.317	4	2 56 34.96	2.3968	13 13 13.9	7.870
5	1 8 6.97	2.2203	5 55 48.7	10.294	5	2 58 58.88	2.4005	13 21 3.7	7.789
6	1 10 20.29	2.2238	6 6 5.6	10.270	6	3 1 23.02	2.4042	13 28 48.6	7.707
7	1 12 33.83	2.2274	6 16 21.1	10.246	7	3 3 47.38	2.4077	13 36 28.6	7.625
8	1 14 47.58	2.2309	6 26 35.1	10.220	8	3 6 11.95	2.4112	13 44 3.6	7.541
9	1 17 1.54	2.2344	6 36 47.5	10.192	9	3 8 36.73	2.4148	13 51 33.5	7.456
10	1 19 15.71	2.2380	6 46 58.2	10.164	10	3 11 1.73	2.4183	13 58 58.3	7.370
11	1 21 30.10	2.2417	6 57 7.2	10.134	11	3 13 26.93	2.4217	14 6 17.9	7.282
12	1 23 44.71	2.2453	7 7 14.3	10.103	12	3 15 52.34	2.4252	14 13 32.2	7.193
13	1 25 59.54	2.2490	7 17 19.5	10.071	13	3 18 17.96	2.4287	14 20 41.1	7.104
14	1 28 14.59	2.2526	7 27 22.8	10.038	14	3 20 43.78	2.4321	14 27 44.7	7.014
15	1 30 29.85	2.2562	7 37 24.1	10.004	15	3 23 9.81	2.4355	14 34 42.8	6.922
16	1 32 45.33	2.2599	7 47 23.3	9.968	16	3 25 36.04	2.4388	14 41 35.4	6.830
17	1 35 1.04	2.2637	7 57 20.3	9.931	17	3 28 2.46	2.4420	14 48 22.4	6.736
18	1 37 16.98	2.2675	8 7 15.0	9.892	18	3 30 29.08	2.4452	14 55 3.7	6.641
19	1 39 33.14	2.2713	8 17 7.4	9.853	19	3 32 55.89	2.4484	15 1 39.3	6.545
20	1 41 49.53	2.2750	8 26 57.4	9.813	20	3 35 22.89	2.4516	15 8 9.1	6.448
21	1 44 6.14	2.2787	8 36 45.0	9.772	21	3 37 50.08	2.4547	15 14 33.1	6.351
22	1 46 22.98	2.2825	8 46 30.0	9.730	22	3 40 17.46	2.4578	15 20 51.2	6.252
23	1 48 40.04	2.2863	8 56 12.4	9.685	23	3 42 45.02	2.4608	15 27 3.3	6.152
24	1 50 57.33	2.2901	N. 9 5 52.2	9.640	24	3 45 12.76	2.4638	N. 15 33 9.4	6.052

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 17.					SUNDAY 19.				
0	3 45 12.76	2.4638	N.15° 33' 9.4"	6.059	0	5 45 43.83	2.5203	N.18° 13' 41.1"	0.447
1	3 47 40.68	2.4667	15 39 9.5	5.950	1	5 48 15.64	2.5206	18 14 4.2	0.393
2	3 50 8.77	2.4696	15 45 3.4	5.847	2	5 50 47.41	2.5203	18 14 19.9	0.190
3	3 52 37.03	2.4724	15 50 51.1	5.744	3	5 53 19.15	2.5207	18 14 28.1	+ 0.075
4	3 55 5.46	2.4752	15 56 32.6	5.640	4	5 55 50.85	2.5210	18 14 28.9	- 0.049
5	3 57 34.05	2.4779	16 2 7.9	5.535	5	5 58 22.50	2.5211	18 14 22.2	0.174
6	4 0 2.80	2.4805	16 7 36.8	5.429	6	6 0 54.10	2.5209	18 14 8.0	0.998
7	4 2 31.71	2.4831	16 12 59.3	5.323	7	6 3 25.64	2.5203	18 13 46.4	0.439
8	4 5 0.77	2.4857	16 18 15.4	5.214	8	6 5 57.13	2.5203	18 13 17.4	0.546
9	4 7 29.99	2.4883	16 23 25.0	5.105	9	6 8 28.56	2.5203	18 12 40.9	0.670
10	4 9 59.35	2.4906	16 28 28.0	4.995	10	6 10 59.92	2.5201	18 11 57.0	0.793
11	4 12 28.86	2.4930	16 33 24.4	4.885	11	6 13 31.21	2.5208	18 11 5.8	0.915
12	4 14 58.51	2.4953	16 38 14.2	4.775	12	6 16 2.42	2.5195	18 10 7.2	1.038
13	4 17 28.29	2.4975	16 42 57.4	4.663	13	6 18 33.55	2.5181	18 9 1.3	1.160
14	4 19 58.21	2.4997	16 47 33.8	4.551	14	6 21 4.50	2.5167	18 7 48.0	1.283
15	4 22 28.26	2.5018	16 52 3.5	4.438	15	6 23 35.55	2.5152	18 6 27.3	1.406
16	4 24 58.43	2.5038	16 56 26.4	4.324	16	6 26 6.41	2.5135	18 4 59.3	1.527
17	4 27 28.72	2.5058	17 0 42.4	4.209	17	6 28 37.17	2.5117	18 3 24.1	1.648
18	4 29 59.13	2.5077	17 4 51.5	4.094	18	6 31 7.82	2.5100	18 1 41.6	1.769
19	4 32 29.65	2.5096	17 8 53.7	3.978	19	6 33 38.37	2.5082	17 59 51.8	1.889
20	4 35 0.28	2.5113	17 12 48.9	3.862	20	6 36 8.81	2.5063	17 57 54.9	2.008
21	4 37 31.01	2.5130	17 16 37.2	3.746	21	6 38 39.13	2.5043	17 55 50.8	2.127
22	4 40 1.84	2.5147	17 20 18.4	3.629	22	6 41 9.33	2.5023	17 53 39.6	2.247
23	4 42 32.77	2.5163	N.17° 23' 52.6"	3.511	23	6 43 39.41	2.5003	N.17° 51' 21.2"	2.366
SATURDAY 18.					MONDAY 20.				
0	4 45 3.79	2.5177	N.17° 27' 19.7"	3.392	0	6 46 9.36	2.4981	N.17° 48' 55.7"	2.484
1	4 47 34.90	2.5192	17 30 39.7	3.273	1	6 48 39.18	2.4959	17 46 23.1	2.602
2	4 50 6.09	2.5205	17 33 52.5	3.153	2	6 51 8.86	2.4936	17 43 43.5	2.719
3	4 52 37.36	2.5217	17 36 58.1	3.033	3	6 53 38.41	2.4913	17 40 56.9	2.835
4	4 55 8.70	2.5229	17 39 56.5	2.913	4	6 56 7.82	2.4889	17 38 3.3	2.951
5	4 57 40.11	2.5241	17 42 47.7	2.793	5	6 58 37.08	2.4865	17 35 2.8	3.067
6	5 0 11.59	2.5252	17 45 31.6	2.672	6	7 1 6.20	2.4840	17 31 55.3	3.183
7	5 2 43.13	2.5261	17 48 8.3	2.550	7	7 3 35.16	2.4814	17 28 40.9	3.296
8	5 5 14.72	2.5269	17 50 37.6	2.428	8	7 6 3.96	2.4788	17 25 19.7	3.409
9	5 7 46.36	2.5277	17 52 59.6	2.306	9	7 8 32.61	2.4761	17 21 51.8	3.522
10	5 10 18.04	2.5284	17 55 14.3	2.183	10	7 11 1.09	2.4733	17 18 17.1	3.634
11	5 12 49.77	2.5291	17 57 21.6	2.060	11	7 13 29.41	2.4706	17 14 35.7	3.746
12	5 15 21.54	2.5297	17 59 21.5	1.937	12	7 15 57.56	2.4678	17 10 47.5	3.858
13	5 17 53.34	2.5303	18 1 14.1	1.814	13	7 18 25.54	2.4648	17 6 52.7	3.968
14	5 20 25.16	2.5308	18 2 59.2	1.690	14	7 20 53.34	2.4619	17 2 51.3	4.077
15	5 22 57.01	2.5310	18 4 36.9	1.567	15	7 23 20.97	2.4590	16 58 43.4	4.186
16	5 25 28.88	2.5312	18 6 7.2	1.443	16	7 25 48.42	2.4559	16 54 29.0	4.294
17	5 28 0.75	2.5313	18 7 30.0	1.318	17	7 28 15.68	2.4528	16 50 8.1	4.403
18	5 30 32.63	2.5314	18 8 45.4	1.194	18	7 30 42.76	2.4497	16 45 40.8	4.508
19	5 33 4.52	2.5314	18 9 53.3	1.070	19	7 33 9.65	2.4466	16 41 7.1	4.614
20	5 35 36.40	2.5313	18 10 53.8	0.946	20	7 35 36.35	2.4434	16 36 27.1	4.719
21	5 38 8.28	2.5312	18 11 46.8	0.822	21	7 38 2.86	2.4402	16 31 40.8	4.824
22	5 40 40.15	2.5310	18 12 32.4	0.697	22	7 40 29.18	2.4370	16 26 48.2	4.927
23	5 43 12.00	2.5307	18 13 10.5	0.573	23	7 42 55.30	2.4337	16 21 49.5	5.029
24	5 45 43.83	2.5303	N.18° 13' 41.1"	0.447	24	7 45 21.22	2.4303	N.16° 16' 44.7"	5.131

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 21.					THURSDAY 23.				
0	7 45 21.22	2.4303	N.16° 16' 44.7"	5.131	0	9 37 50.61	2.3557	N.10° 30' 38.9"	8.911
1	7 47 46.94	2.4270	16 11 33.8	5.239	1	9 40 5.85	2.3523	10 21 42.6	8.925
2	7 50 12.46	2.4236	16 6 16.8	5.333	2	9 42 20.89	2.3489	10 12 43.1	9.018
3	7 52 37.77	2.4201	16 0 53.8	5.432	3	9 44 35.72	2.3455	10 3 40.4	9.071
4	7 55 2.87	2.4167	15 55 24.9	5.530	4	9 46 50.35	2.3421	9 54 34.6	9.122
5	7 57 27.77	2.4132	15 49 50.2	5.628	5	9 49 4.77	2.3387	9 45 25.8	9.172
6	7 59 52.46	2.4097	15 44 9.6	5.725	6	9 51 18.99	2.3353	9 36 14.0	9.221
7	8 2 16.94	2.4062	15 38 23.2	5.821	7	9 53 33.01	2.3320	9 26 59.3	9.268
8	8 4 41.21	2.4027	15 32 31.1	5.915	8	9 55 46.83	2.3287	9 17 41.8	9.315
9	8 7 5.26	2.3991	15 26 33.4	6.009	9	9 58 0.45	2.3253	9 8 21.5	9.361
10	8 9 29.10	2.3955	15 20 30.0	6.102	10	10 0 13.87	2.3221	8 58 58.5	9.406
11	8 11 52.72	2.3918	15 14 21.1	6.194	11	10 2 27.10	2.3189	8 49 32.8	9.450
12	8 14 16.12	2.3882	15 8 6.7	6.286	12	10 4 40.14	2.3157	8 40 4.5	9.492
13	8 16 39.30	2.3846	15 1 46.8	6.377	13	10 6 52.90	2.3126	8 30 33.7	9.534
14	8 19 2.27	2.3810	14 55 21.5	6.468	14	10 9 5.65	2.3094	8 21 0.4	9.576
15	8 21 25.02	2.3773	14 48 50.9	6.553	15	10 11 18.12	2.3063	8 11 24.6	9.616
16	8 23 47.54	2.3735	14 42 15.1	6.640	16	10 13 30.41	2.3032	8 1 46.5	9.654
17	8 26 9.84	2.3698	14 35 34.1	6.727	17	10 15 42.51	2.3002	7 52 6.1	9.692
18	8 28 31.92	2.3661	14 28 47.9	6.812	18	10 17 54.43	2.2972	7 42 23.5	9.729
19	8 30 53.78	2.3624	14 21 56.6	6.897	19	10 20 6.17	2.2942	7 32 38.7	9.765
20	8 33 15.41	2.3587	14 15 0.2	6.981	20	10 22 17.73	2.2913	7 22 51.7	9.800
21	8 35 36.82	2.3549	14 7 58.9	7.063	21	10 24 29.12	2.2884	7 13 2.7	9.833
22	8 37 58.00	2.3512	14 0 52.7	7.144	22	10 26 40.34	2.2855	7 3 11.7	9.866
23	8 40 18.96	2.3475	N.13° 53' 41.6"	7.226	23	10 28 51.38	2.2826	N. 6° 53' 18.8"	9.897
WEDNESDAY 22.					FRIDAY 24.				
0	8 42 39.70	2.3437	N.13° 46' 25.6"	7.306	0	10 31 2.25	2.2797	N. 6° 43' 24.0"	9.926
1	8 45 0.21	2.3400	13 39 4.9	7.384	1	10 33 12.95	2.2770	6 33 27.4	9.958
2	8 47 20.50	2.3362	13 31 39.5	7.462	2	10 35 23.49	2.2743	6 23 29.0	9.987
3	8 49 40.56	2.3325	13 24 9.5	7.538	3	10 37 33.87	2.2716	6 13 28.9	10.015
4	8 52 0.40	2.3287	13 16 35.0	7.613	4	10 39 44.08	2.2689	6 3 27.2	10.042
5	8 54 20.01	2.3250	13 8 55.9	7.688	5	10 41 54.14	2.2663	5 53 23.9	10.068
6	8 56 39.40	2.3212	13 1 12.4	7.763	6	10 44 4.04	2.2637	5 43 19.0	10.093
7	8 58 58.56	2.3175	12 53 24.5	7.834	7	10 46 13.78	2.2611	5 33 12.7	10.117
8	9 1 17.50	2.3138	12 45 32.3	7.906	8	10 48 23.37	2.2586	5 23 5.0	10.139
9	9 3 36.22	2.3101	12 37 35.8	7.977	9	10 50 32.81	2.2561	5 12 56.0	10.161
10	9 5 54.71	2.3064	12 29 35.1	8.046	10	10 52 42.10	2.2536	5 2 45.7	10.182
11	9 8 12.98	2.3027	12 21 30.3	8.114	11	10 54 51.24	2.2511	4 52 34.1	10.203
12	9 10 31.03	2.2990	12 13 21.4	8.182	12	10 57 0.24	2.2486	4 42 21.3	10.222
13	9 12 48.86	2.2953	12 5 8.5	8.248	13	10 59 9.09	2.2464	4 32 7.4	10.240
14	9 15 6.47	2.2917	11 56 51.6	8.314	14	11 1 17.81	2.2441	4 21 52.5	10.257
15	9 17 23.86	2.2880	11 48 30.8	8.378	15	11 3 26.39	2.2418	4 11 36.6	10.273
16	9 19 41.03	2.2843	11 40 6.2	8.442	16	11 5 34.83	2.2396	4 1 19.8	10.288
17	9 21 57.98	2.2807	11 31 37.8	8.503	17	11 7 43.14	2.2374	3 51 2.0	10.303
18	9 24 14.71	2.2771	11 23 5.8	8.564	18	11 9 51.32	2.2352	3 40 43.4	10.316
19	9 26 31.23	2.2735	11 14 30.1	8.625	19	11 11 59.37	2.2331	3 30 24.1	10.328
20	9 28 47.53	2.2699	11 5 50.8	8.685	20	11 14 7.29	2.2310	3 20 4.0	10.340
21	9 31 3.62	2.2664	10 57 7.9	8.743	21	11 16 15.09	2.2290	3 9 43.2	10.352
22	9 33 19.50	2.2628	10 48 21.6	8.800	22	11 18 22.77	2.2270	2 59 21.8	10.361
23	9 35 35.16	2.2592	10 39 31.9	8.856	23	11 20 30.33	2.2250	2 48 59.9	10.369
24	9 37 50.61	2.2557	N.10° 30' 38.9"	8.911	24	11 22 37.77	2.2231	N. 2° 38' 37.5"	10.377

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 25.					MONDAY 27.				
0	11 22 37.77	2.1931	N. 2° 38' 37.5"	10.377	0	13 3 0.22	2.0794	S. 5° 31' 31.5"	9.790
1	11 24 45.10	2.1919	2 28 14.7	10.384	1	13 5 4.55	2.0791	5 41 13.7	9.687
2	11 26 52.31	2.1193	2 17 51.5	10.390	2	13 7 8.87	2.0719	5 50 53.9	9.659
3	11 28 59.41	2.1175	2 7 27.9	10.395	3	13 9 13.18	2.0717	6 0 32.0	9.617
4	11 31 6.41	2.1157	1 57 4.1	10.399	4	13 11 17.48	2.0715	6 10 7.9	9.581
5	11 33 13.30	2.1139	1 46 40.1	10.402	5	13 13 21.76	2.0713	6 19 41.7	9.545
6	11 35 20.08	2.1122	1 36 15.9	10.404	6	13 15 26.03	2.0712	6 29 13.3	9.507
7	11 37 26.76	2.1106	1 25 51.6	10.406	7	13 17 30.30	2.0711	6 38 42.6	9.468
8	11 39 33.35	2.1090	1 15 27.2	10.406	8	13 19 34.56	2.0709	6 48 9.5	9.429
9	11 41 39.84	2.1074	1 5 2.9	10.405	9	13 21 38.81	2.0708	6 57 34.1	9.390
10	11 43 46.24	2.1058	0 54 38.6	10.404	10	13 23 43.06	2.0708	7 6 56.3	9.349
11	11 45 52.54	2.1042	0 44 14.4	10.402	11	13 25 47.31	2.0707	7 16 16.0	9.308
12	11 47 58.75	2.1026	0 33 50.4	10.399	12	13 27 51.55	2.0707	7 25 33.3	9.267
13	11 50 4.88	2.1014	0 23 26.6	10.396	13	13 29 55.80	2.0706	7 34 48.1	9.224
14	11 52 10.92	2.0999	0 13 3.0	10.390	14	13 32 0.05	2.0706	7 44 0.2	9.180
15	11 54 16.87	2.0985	N. 0 2 30.8	10.384	15	13 34 4.30	2.0705	7 53 9.7	9.137
16	11 56 22.74	2.0972	S. 0 7 43.0	10.377	16	13 36 8.56	2.0710	8 2 16.6	9.093
17	11 58 28.53	2.0959	0 18 5.4	10.370	17	13 38 12.82	2.0711	8 11 20.8	9.048
18	12 0 34.25	2.0947	0 28 27.4	10.362	18	13 40 17.09	2.0712	8 20 22.3	9.009
19	12 2 39.89	2.0934	0 38 48.8	10.352	19	13 42 21.37	2.0714	8 29 21.0	8.954
20	12 4 45.46	2.0922	0 49 9.6	10.342	20	13 44 25.66	2.0715	8 38 16.8	8.907
21	12 6 50.96	2.0911	0 59 29.8	10.331	21	13 46 29.95	2.0716	8 47 9.8	8.859
22	12 8 56.39	2.0899	1 9 49.3	10.319	22	13 48 34.25	2.0718	8 55 59.9	8.810
23	12 11 1.75	2.0888	S. 1 20 8.1	10.306	23	13 50 38.57	2.0721	S. 9 4 47.0	8.761
SUNDAY 26.					TUESDAY 28.				
0	12 13 7.05	2.0876	S. 1 30 26.0	10.299	0	13 52 42.90	2.0723	S. 9 13 31.2	8.719
1	12 15 12.29	2.0862	1 40 43.1	10.278	1	13 54 47.24	2.0725	9 22 12.4	8.661
2	12 17 17.47	2.0858	1 50 59.4	10.263	2	13 56 51.60	2.0728	9 30 50.5	8.609
3	12 19 22.59	2.0846	2 1 14.7	10.247	3	13 58 55.98	2.0731	9 39 25.4	8.556
4	12 21 27.65	2.0839	2 11 29.0	10.230	4	14 1 0.38	2.0734	9 47 57.2	8.504
5	12 23 32.66	2.0831	2 21 42.3	10.212	5	14 3 4.79	2.0737	9 56 25.8	8.451
6	12 25 37.62	2.0822	2 31 54.5	10.194	6	14 5 9.22	2.0740	10 4 51.3	8.397
7	12 27 42.53	2.0814	2 42 5.6	10.174	7	14 7 13.67	2.0743	10 13 13.5	8.342
8	12 29 47.39	2.0807	2 52 15.4	10.153	8	14 9 18.14	2.0747	10 21 32.4	8.287
9	12 31 52.21	2.0799	3 2 24.0	10.132	9	14 11 22.63	2.0751	10 29 47.9	8.231
10	12 33 56.98	2.0792	3 12 31.3	10.111	10	14 13 27.15	2.0755	10 38 0.1	8.175
11	12 36 1.71	2.0785	3 22 37.3	10.088	11	14 15 31.69	2.0758	10 46 8.9	8.118
12	12 38 6.40	2.0778	3 32 41.9	10.064	12	14 17 36.25	2.0762	10 54 14.3	8.061
13	12 40 11.05	2.0772	3 42 45.0	10.040	13	14 19 40.84	2.0766	11 2 16.2	8.008
14	12 42 15.66	2.0766	3 52 46.7	10.016	14	14 21 45.45	2.0770	11 10 14.6	7.943
15	12 44 20.24	2.0761	4 2 46.9	9.990	15	14 23 50.08	2.0774	11 18 9.4	7.884
16	12 46 24.79	2.0756	4 12 45.5	9.963	16	14 25 54.74	2.0778	11 26 0.7	7.824
17	12 48 29.31	2.0751	4 22 42.4	9.935	17	14 27 59.42	2.0782	11 33 48.3	7.763
18	12 50 33.80	2.0746	4 32 37.7	9.907	18	14 30 4.13	2.0787	11 41 32.3	7.702
19	12 52 38.26	2.0742	4 42 31.3	9.878	19	14 32 8.87	2.0792	11 49 12.6	7.641
20	12 54 42.70	2.0737	4 52 23.1	9.848	20	14 34 13.64	2.0797	11 56 49.2	7.579
21	12 56 47.11	2.0733	5 2 13.0	9.817	21	14 36 18.43	2.0801	12 4 22.1	7.517
22	12 58 51.50	2.0730	5 12 1.1	9.786	22	14 38 23.25	2.0806	12 11 51.2	7.453
23	13 0 55.87	2.0727	5 21 47.3	9.753	23	14 40 28.10	2.0811	12 19 16.5	7.389
24	13 3 0.22	2.0724	S. 5 31 31.5	9.720	24	14 42 32.98	2.0816	S. 12 26 37.9	7.325

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.					
WEDNESDAY 29.					FRIDAY, MAY 1.									
0	14 42 32.98	2.0816	S. 12° 26' 37.9"	7.385	0	16 22 58.34	2.0098	S. 16° 55' 29.9"	3.736					
1	14 44 37.89	2.0891	12 33 55.5	7.960	PHASES OF THE MOON.									
2	14 46 42.83	2.0885	12 41 9.1	7.194										
3	14 48 47.79	2.0899	12 48 18.8	7.198										
4	14 50 52.78	2.0834	12 55 24.5	7.069										
5	14 52 57.80	2.0839	13 2 26.2	6.995										
6	14 55 2.85	2.0844	13 9 23.9	6.997										
7	14 57 7.93	2.0849	13 16 17.5	6.859										
8	14 59 13.04	2.0854	13 23 7.0	6.798										
9	15 1 18.18	2.0859	13 29 52.5	6.793										
10	15 3 23.35	2.0864	13 36 33.8	6.653										
11	15 5 28.55	2.0868	13 43 10.9	6.583	☾ Last Quarter. . . April 7 2 42.4 ● New Moon . . . . . 14 17 51.8 ☽ First Quarter . . . . . 21 11 20.1 ○ Full Moon . . . . . 28 18 14.2									
12	15 7 33.77	2.0873	13 49 43.8	6.513										
13	15 9 39.03	2.0879	13 56 12.5	6.449										
14	15 11 44.32	2.0883	14 2 36.9	6.371										
15	15 13 49.63	2.0888	14 8 57.0	6.399										
16	15 15 54.97	2.0893	14 15 12.8	6.398										
17	15 18 0.34	2.0898	14 21 24.3	6.156										
18	15 20 5.74	2.0902	14 27 31.5	6.083										
19	15 22 11.17	2.0907	14 33 34.3	6.009										
20	15 24 16.62	2.0911	14 39 32.6	5.935										
21	15 26 22.10	2.0916	14 45 26.5	5.969	☾ Apogee. . . . . April 6 4.6 ☾ Perigee. . . . . 18 2.9									
22	15 28 27.61	2.0920	14 51 16.0	5.788										
23	15 30 33.14	2.0924	S. 14 57 1.0	5.713										
THURSDAY 30.														
0	15 32 38.70	2.0929	S. 15 2 41.5	5.638						☾ Apogee. . . . . April 6 4.6 ☾ Perigee. . . . . 18 2.9				
1	15 34 44.29	2.0933	15 8 17.5	5.569										
2	15 36 49.90	2.0937	15 13 48.9	5.485										
3	15 38 55.53	2.0941	15 19 15.7	5.409										
4	15 41 1.19	2.0945	15 24 38.0	5.333										
5	15 43 6.87	2.0948	15 29 55.7	5.256										
6	15 45 12.57	2.0952	15 35 8.7	5.178										
7	15 47 18.29	2.0956	15 40 17.1	5.101										
8	15 49 24.04	2.0960	15 45 20.8	5.023										
9	15 51 29.81	2.0963	15 50 19.8	4.944										
10	15 53 35.60	2.0967	15 55 14.1	4.865	☾ Apogee. . . . . April 6 4.6 ☾ Perigee. . . . . 18 2.9									
11	15 55 41.41	2.0970	16 0 3.6	4.786										
12	15 57 47.24	2.0973	16 4 48.4	4.707										
13	15 59 53.09	2.0976	16 9 28.4	4.627										
14	16 1 58.95	2.0978	16 14 3.6	4.548										
15	16 4 4.83	2.0981	16 18 34.1	4.468										
16	16 6 10.73	2.0984	16 22 59.8	4.387										
17	16 8 16.64	2.0986	16 27 20.6	4.307										
18	16 10 22.56	2.0988	16 31 36.6	4.226										
19	16 12 28.49	2.0990	16 35 47.7	4.144										
20	16 14 34.44	2.0992	16 39 53.9	4.063	☾ Apogee. . . . . April 6 4.6 ☾ Perigee. . . . . 18 2.9									
21	16 16 40.40	2.0994	16 43 55.3	3.982										
22	16 18 46.37	2.0996	16 47 51.8	3.900										
23	16 20 52.35	2.0997	16 51 43.3	3.818										
24	16 22 58.34	2.0998	S. 16 55 29.9	3.736										

GREENWICH MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Pollux	W.	101° 35' 44"	9837	103° 9' 24"	9851	104° 42' 46"	9864	106° 15' 51"	9878
	JUPITER	W.	67 7 46	9735	68 43 39	9747	70 19 16	9760	71 54 37	9772
	Regulus	W.	65 23 35	9751	66 59 7	9763	68 34 23	9775	70 9 23	9787
	Antares	E.	35 14 4	9925	33 42 17	9953	32 11 5	9964	30 40 32	3017
	α Aquilæ	E.	85 43 13	3155	84 16 10	3169	82 49 24	3185	81 22 57	3200
2	JUPITER	W.	79 47 25	9831	81 21 12	9843	82 54 44	9855	84 28 1	9866
	Regulus	W.	78 0 30	9847	79 33 57	9859	81 7 9	9870	82 40 6	9882
	Spica	W.	24 37 45	9886	26 10 22	9893	27 42 50	9900	29 15 9	9908
	α Aquilæ	E.	74 15 34	3268	72 51 9	3307	71 27 6	3328	70 3 27	3349
3	JUPITER	W.	92 10 52	9990	93 42 45	9931	95 14 25	9940	96 45 53	9950
	Regulus	W.	90 21 19	9935	91 52 53	9946	93 24 14	9955	94 55 23	9965
	Spica	W.	36 54 7	9950	38 25 22	9959	39 56 26	9967	41 27 20	9976
	α Aquilæ	E.	63 11 23	3463	61 50 18	3488	60 29 41	3515	59 9 34	3544
	Fomalhaut	E.	94 54 0	3318	93 30 9	3336	92 6 28	3336	90 42 58	3345
	SUN	E.	135 6 22	3290	133 41 59	3300	132 17 48	3312	130 53 50	3322
4	Regulus	W.	102 28 15	3008	103 58 18	3016	105 28 11	3023	106 57 55	3030
	Spica	W.	48 59 17	3014	50 29 12	3021	51 58 59	3028	53 28 37	3034
	α Aquilæ	E.	52 37 9	3705	51 20 27	3744	50 4 26	3784	48 49 7	3827
	Fomalhaut	E.	83 48 9	3394	82 25 46	3404	81 3 34	3415	79 41 34	3425
	α Pegasi	E.	98 47 17	3225	97 21 38	3233	95 56 7	3238	94 30 43	3244
	SUN	E.	123 56 51	3368	122 33 58	3377	121 11 15	3385	119 48 41	3392
5	Spica	W.	60 55 0	3080	62 23 59	3064	63 52 53	3068	65 21 42	3072
	Antares	W.	17 33 11	3723	18 49 34	3632	20 7 34	3559	21 26 53	3500
	α Aquilæ	E.	42 44 39	4096	41 34 33	4164	40 25 33	4238	39 17 43	4320
	Fomalhaut	E.	72 54 38	3481	71 33 53	3493	70 13 21	3506	68 53 3	3518
	α Pegasi	E.	87 25 25	3272	86 0 41	3276	84 36 2	3282	83 11 29	3287
	SUN	E.	112 57 47	3423	111 35 56	3427	110 14 10	3431	108 52 29	3436
6	Spica	W.	72 44 57	3081	74 13 30	3081	75 42 3	3081	77 10 36	3081
	Antares	W.	28 16 31	3396	29 40 12	3304	31 4 19	3265	32 28 48	3268
	Fomalhaut	E.	62 15 9	3587	60 56 20	3603	59 37 49	3620	58 19 36	3637
	α Pegasi	E.	76 10 8	3309	74 46 7	3313	73 22 10	3317	71 58 18	3321
	SUN	E.	102 4 58	3446	100 43 34	3447	99 22 11	3447	98 0 48	3447
7	Spica	W.	84 33 40	3071	86 2 25	3069	87 31 13	3065	89 0 6	3060
	Antares	W.	39 35 39	3202	41 1 46	3190	42 28 7	3179	43 54 41	3168
	Fomalhaut	E.	51 53 37	3744	50 37 36	3789	49 22 2	3798	48 6 58	3799
	α Pegasi	E.	65 0 4	3339	63 36 38	3343	62 13 16	3347	60 49 59	3352
	SUN	E.	91 13 36	3438	89 52 2	3434	88 30 24	3430	87 8 41	3425
8	Spica	W.	96 26 4	3032	97 55 37	3025	99 25 19	3017	100 55 11	3009
	Antares	W.	51 10 43	3116	52 38 33	3105	54 6 36	3094	55 34 53	3082
	Fomalhaut	E.	42 0 46	4040	40 49 46	4098	39 39 42	4161	38 30 39	4233
	α Pegasi	E.	53 55 0	3380	52 32 21	3387	51 9 50	3395	49 47 26	3405
	SUN	E.	80 18 36	3394	78 56 13	3386	77 33 41	3379	76 11 0	3370
9	Antares	W.	62 59 45	3025	64 29 27	3013	65 59 24	3000	67 29 37	2998
	Fomalhaut	E.	33 5 0	4760	32 4 51	4915	31 6 48	5094	30 11 6	5300
	α Pegasi	E.	42 58 57	3479	41 38 9	3500	40 17 45	3525	38 57 49	3555

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Pollux W.	107 48 38	2999	109 21 7	2906	110 53 18	2990	112 25 11	2935
	JUPITER W.	73 29 42	2784	75 4 31	2795	76 39 5	2808	78 13 23	2890
	Regulus W.	71 44 8	2799	73 18 37	2811	74 52 50	2823	76 26 48	2835
	Antares E.	29 10 40	3054	27 41 34	3006	26 13 19	3143	24 46 1	3196
	α Aquilæ E.	79 56 48	3217	78 30 59	3224	77 5 30	3251	75 40 21	3270
2	JUPITER W.	86 1 3	2877	87 33 51	2888	89 6 25	2899	90 38 45	2909
	Regulus W.	84 12 48	2893	85 45 16	2903	87 17 31	2914	88 49 32	2925
	Spica W.	30 47 18	2916	32 19 16	2924	33 51 4	2933	35 22 41	2942
	α Aquilæ E.	68 40 12	3370	67 17 21	3383	65 54 56	3415	64 32 56	3438
3	JUPITER W.	98 17 8	2960	99 48 11	2969	101 19 3	2977	102 49 44	2986
	Regulus W.	96 26 20	2974	97 57 5	2983	99 27 39	2992	100 58 2	3000
	Spica W.	42 58 3	2984	44 28 36	2992	45 58 50	2999	47 29 13	3007
	α Aquilæ E.	57 49 58	3574	56 30 55	3604	55 12 25	3635	53 54 29	3669
	Fomalhaut E.	89 19 38	3354	87 56 29	3364	86 33 31	3373	85 10 44	3384
	SUN E.	129 30 4	3332	128 6 30	3342	126 43 7	3351	125 19 54	3359
4	Regulus W.	108 27 31	3037	109 56 58	3043	111 26 18	3049	112 55 30	3055
	Spica W.	54 58 8	3040	56 27 31	3046	57 56 47	3052	59 25 56	3058
	α Aquilæ E.	47 34 33	3273	46 20 46	3292	45 7 49	3276	43 55 46	4033
	Fomalhaut E.	78 19 46	3436	76 58 10	3447	75 36 47	3458	74 15 36	3470
	α Pegasi E.	93 5 26	3250	91 40 16	3255	90 15 12	3261	88 50 15	3267
	SUN E.	118 26 15	3399	117 3 57	3406	115 41 47	3412	114 19 44	3417
5	Spica W.	66 50 26	3074	68 19 7	3076	69 47 46	3078	71 16 23	3080
	Antares W.	22 47 17	3452	24 8 35	3413	25 30 37	3379	26 53 18	3351
	α Aquilæ W.	38 11 9	4409	37 5 56	4509	36 2 12	4621	35 0 5	4745
	Fomalhaut E.	67 32 59	3531	66 13 9	3545	64 53 34	3558	63 34 14	3572
	α Pegasi E.	81 47 2	3292	80 22 41	3296	78 58 25	3300	77 34 14	3305
	SUN E.	107 30 53	3438	106 9 20	3441	104 47 50	3444	103 26 23	3446
6	Spica W.	78 39 9	3080	80 7 43	3078	81 36 19	3076	83 4 58	3073
	Antares W.	33 53 37	3253	35 18 44	3229	36 44 7	3225	38 9 46	3214
	Fomalhaut E.	57 1 42	3256	55 44 8	3276	54 26 55	3296	53 10 4	3279
	α Pegasi E.	70 34 31	3325	69 10 48	3328	67 47 9	3332	66 23 34	3336
	SUN E.	96 39 25	3446	95 18 1	3445	93 56 35	3443	92 35 7	3440
7	Spica W.	90 29 5	3055	91 58 10	3050	93 27 21	3044	94 56 39	3039
	Antares W.	45 21 28	3158	46 48 28	3148	48 15 40	3137	49 43 5	3128
	Fomalhaut E.	46 52 26	3284	45 38 30	3292	44 25 12	3293	43 12 36	3289
	α Pegasi E.	59 26 48	3357	58 3 42	3361	56 40 41	3367	55 17 47	3373
	SUN E.	85 46 53	3420	84 24 59	3414	83 2 58	3408	81 40 51	3401
8	Spica W.	102 25 13	3001	103 55 25	2993	105 25 47	2983	106 56 21	2973
	Antares W.	57 3 24	3072	58 32 8	3060	60 1 6	3049	61 30 18	3037
	Fomalhaut E.	37 22 44	4314	36 16 4	4405	35 10 47	4508	34 7 2	4626
	α Pegasi E.	48 25 17	3416	47 3 19	3429	45 41 35	3443	44 20 7	3459
	SUN E.	74 48 9	3300	73 25 7	3351	72 1 55	3341	70 38 31	3331
9	Antares W.	69 0 5	2975	70 30 49	2962	72 1 50	2947	73 33 9	2934
	Fomalhaut E.	29 17 59	5541	28 27 44	5593	27 40 38	5656	26 57 1	5729
	α Pegasi E.	37 38 25	3588	36 19 38	3629	35 1 35	3676	33 44 22	3729

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
9	SUN E.	69 14 55	3319	67 51 6	3306	66 27 4	3296	65 2 48	3284
10	Antares W.	75 4 45	2990	76 36 38	2906	78 8 49	2899	79 41 18	2878
	α Aquilæ W.	33 36 28	4582	34 39 8	4436	35 43 57	4304	36 50 46	4185
	SUN E.	57 57 46	3218	56 31 58	3204	55 5 53	3189	53 39 31	3175
11	Antares W.	87 28 21	2805	89 2 43	2789	90 37 25	2775	92 12 26	2760
	α Aquilæ W.	42 50 15	3731	44 6 29	3661	45 23 58	3596	46 42 37	3535
	SUN E.	46 23 10	3098	44 54 58	3082	43 26 26	3065	41 57 34	3050
12	Antares W.	100 12 29	2685	101 49 29	2670	103 26 49	2656	105 4 28	2641
	α Aquilæ W.	53 31 21	3285	54 55 50	3244	56 21 7	3205	57 47 10	3168
	SUN E.	34 28 17	2969	32 57 25	2953	31 26 13	2937	29 54 41	2922
16	SUN W.	16 51 57	2570	18 31 33	2559	20 11 24	2550	21 51 28	2542
	SATURN E.	37 6 52	2998	35 20 50	2925	33 34 43	2893	31 48 33	2891
	Pollux E.	69 1 49	2345	67 16 55	2343	65 31 56	2339	63 46 53	2337
	JUPITER E.	102 43 5	2247	100 55 48	2241	99 8 22	2236	97 20 48	2231
	Regulus E.	105 2 22	2247	103 15 5	2241	101 27 39	2236	99 40 5	2231
17	SUN W.	30 14 6	2515	31 54 58	2512	33 35 54	2510	35 16 54	2507
	Pollux E.	55 1 30	2343	53 16 33	2342	51 31 43	2353	49 47 1	2360
	JUPITER E.	88 21 19	2212	86 33 10	2210	84 44 58	2208	82 56 43	2206
	Regulus E.	90 40 32	2212	88 52 22	2210	87 4 9	2208	85 15 53	2206
18	SUN W.	43 42 26	2504	45 23 34	2504	47 4 41	2506	48 45 46	2508
	Pollux E.	41 6 46	2421	39 23 41	2439	37 41 2	2462	35 58 55	2477
	JUPITER E.	73 55 15	2208	72 6 59	2209	70 18 45	2210	68 30 33	2213
	Regulus E.	76 14 10	2205	74 25 50	2206	72 37 32	2206	70 49 17	2210
19	SUN W.	57 10 26	2522	58 51 9	2525	60 31 47	2529	62 12 20	2533
	Aldebaran W.	18 20 18	2218	20 8 19	2220	21 56 16	2224	23 44 8	2228
	JUPITER E.	59 30 37	2230	57 42 54	2234	55 55 17	2239	54 7 48	2244
	Regulus E.	61 48 51	2224	60 1 0	2229	58 13 15	2233	56 25 37	2239
	Spica E.	115 18 52	2225	113 31 1	2226	111 43 15	2231	109 55 34	2235
20	SUN W.	70 33 24	2560	72 13 14	2566	73 52 56	2572	75 32 30	2577
	Aldebaran W.	32 41 52	2251	34 29 3	2257	36 16 6	2262	38 3 1	2268
	SATURN W.	20 44 21	2260	22 28 53	2255	24 13 31	2261	25 58 18	2260
	JUPITER E.	45 12 28	2276	43 25 53	2283	41 39 29	2291	39 53 16	2300
	Regulus E.	47 29 21	2266	45 42 31	2272	43 55 51	2279	42 9 21	2286
	Spica E.	100 58 46	2259	99 11 46	2264	97 24 54	2270	95 38 11	2277
21	SUN W.	83 48 7	2612	85 26 46	2619	87 5 15	2626	88 43 34	2634
	Aldebaran W.	46 55 22	2300	48 41 22	2306	50 27 13	2313	52 12 54	2320
	SATURN W.	34 41 50	2361	36 26 21	2366	38 10 45	2371	39 55 2	2375
	JUPITER E.	31 5 34	2351	29 20 49	2364	27 36 22	2378	25 52 15	2394
	Regulus E.	33 19 37	2327	31 34 17	2337	29 49 12	2348	28 4 23	2359
	Spica E.	86 46 48	2308	85 1 0	2314	83 15 21	2321	81 29 52	2328
22	SUN W.	96 52 36	2672	98 29 53	2681	100 6 59	2688	101 43 55	2696
	Aldebaran W.	60 58 45	2355	62 43 24	2362	64 27 53	2370	66 12 11	2377
	SATURN W.	48 34 31	2405	50 17 59	2412	52 1 17	2418	53 44 26	2424



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
9	SUN E.	63 38 18	2871	62 13 33	2859	60 48 33	2846	59 23 18	2831
10	Antares W.	81 14 5	2863	82 47 11	2849	84 20 35	2835	85 54 18	2819
	α Aquilæ W.	37 59 26	4077	39 9 50	3970	40 21 50	3890	41 35 20	3807
	SUN E.	52 12 52	3159	50 45 54	3144	49 18 38	3129	47 51 3	3114
11	Antares W.	93 47 47	2744	95 23 28	2729	96 59 29	2715	98 35 49	2700
	α Aquilæ W.	48 2 23	3479	49 23 11	3465	50 44 59	3378	52 7 43	3329
	SUN E.	40 28 23	3034	38 58 52	3018	37 29 1	3001	35 58 49	2985
12	Antares W.	106 42 27	2627	108 20 45	2613	109 59 22	2599	111 38 18	2586
	α Aquilæ W.	59 13 58	3133	60 41 28	3099	62 9 39	3067	63 38 29	3037
	SUN E.	28 22 50	2906	26 50 39	2891	25 18 8	2876	23 45 19	2862
16	SUN W.	23 31 43	2635	25 12 7	2599	26 52 40	2584	28 33 20	2569
	SATURN E.	30 2 21	2291	28 16 9	2293	26 29 59	2296	24 43 54	2301
	POLLUX E.	62 1 48	2337	60 16 42	2337	58 31 37	2337	56 46 32	2339
	JUPITER E.	95 33 7	2227	93 45 19	2222	91 57 24	2218	90 9 24	2215
	Regulus E.	97 52 23	2226	96 4 34	2229	94 16 39	2218	92 28 38	2214
17	SUN W.	36 57 57	2505	38 39 3	2504	40 20 10	2504	42 1 18	2504
	POLLUX E.	48 2 29	2368	46 18 9	2378	44 34 3	2390	42 50 14	2405
	JUPITER E.	81 8 27	2207	79 20 10	2206	77 31 52	2206	75 43 33	2206
	Regulus E.	83 27 34	2204	81 39 13	2204	79 50 52	2204	78 2 31	2204
18	SUN W.	50 26 48	2610	52 7 48	2512	53 48 45	2515	55 29 38	2518
	POLLUX E.	34 17 23	2517	32 36 33	2552	30 56 32	2593	29 17 27	2642
	JUPITER E.	66 42 25	2216	64 54 21	2218	63 6 21	2222	61 18 26	2226
	Regulus E.	69 1 4	2212	67 12 54	2214	65 24 48	2218	63 36 47	2221
19	SUN W.	63 52 47	2538	65 33 7	2543	67 13 20	2548	68 53 26	2554
	Aldebaran W.	25 31 54	2222	27 19 34	2227	29 7 7	2241	30 54 33	2246
	JUPITER E.	52 20 26	2250	50 33 13	2256	48 46 8	2269	46 50 13	2280
	Regulus E.	54 38 7	2243	52 50 44	2248	51 3 28	2253	49 16 20	2260
	Spica E.	108 7 59	2239	106 20 30	2244	104 33 8	2249	102 45 53	2254
20	SUN W.	77 11 56	2584	78 51 13	2591	80 30 21	2598	82 9 19	2605
	Aldebaran W.	39 49 47	2274	41 36 25	2281	43 22 53	2287	45 9 12	2293
	SATURN W.	27 43 4	2350	29 27 50	2352	31 12 34	2355	32 57 14	2357
	JUPITER E.	38 7 16	2309	36 21 29	2318	34 35 55	2328	32 50 36	2339
	Regulus E.	40 23 1	2293	38 36 52	2292	36 50 55	2310	35 5 10	2318
	Spica E.	93 51 37	2292	92 5 11	2298	90 18 54	2294	88 32 46	2301
21	SUN W.	90 21 43	2641	91 59 42	2649	93 37 30	2656	95 15 8	2664
	Aldebaran W.	53 58 25	2326	55 43 46	2334	57 28 56	2341	59 13 56	2348
	SATURN W.	41 39 12	2381	43 23 14	2387	45 7 8	2392	46 50 54	2398
	JUPITER E.	24 8 31	2412	22 25 13	2422	20 42 24	2457	19 0 10	2487
	Regulus E.	26 19 50	2371	24 35 34	2385	22 51 38	2400	21 8 4	2418
	Spica E.	79 44 34	2335	77 59 26	2342	76 14 28	2350	74 29 41	2357
22	SUN W.	103 20 40	2704	104 57 14	2713	106 33 37	2721	108 9 49	2729
	Aldebaran W.	67 56 19	2364	69 40 16	2369	71 24 2	2400	73 7 37	2408
	SATURN W.	55 27 26	2431	57 10 16	2438	58 52 56	2445	60 35 26	2453

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
22	Pollux W.	20 50 57	3138	22 18 20	3037	23 47 47	2957	25 18 54	2894
	Spica E.	72 45 4	3364	71 0 38	3273	69 16 23	3380	67 32 19	3367
23	Sun W.	109 45 50	2738	111 21 40	2746	112 57 19	2754	114 32 47	2763
	Aldebaran W.	74 51 1	2415	76 34 14	2422	78 17 17	2430	80 0 9	2438
	SATURN W.	62 17 45	2460	63 59 54	2467	65 41 53	2475	67 23 41	2482
	Pollux W.	33 10 15	2719	34 46 29	2702	36 23 6	2687	38 0 3	2676
	Spica E.	58 54 45	2426	57 11 48	2435	55 29 3	2443	53 46 30	2451
	Antares E.	104 31 58	2475	102 50 9	2482	101 8 30	2488	99 27 0	2495
24	Sun W.	122 27 19	2806	124 1 39	2815	125 35 48	2824	127 9 45	2832
	Aldebaran W.	88 31 44	2477	90 13 30	2485	91 55 5	2492	93 36 29	2500
	SATURN W.	75 50 4	2521	77 30 48	2528	79 11 22	2536	80 51 45	2545
	Pollux W.	46 7 37	2649	47 45 25	2648	49 23 15	2648	51 1 5	2649
	Spica E.	45 16 39	2484	43 35 18	2503	41 54 9	2519	40 13 13	2522
	Antares E.	91 2 4	2533	89 21 36	2541	87 41 20	2549	86 1 15	2557
25	Aldebaran W.	102 0 42	2540	103 40 59	2549	105 21 4	2557	107 0 58	2565
	SATURN W.	89 10 52	2585	90 50 8	2593	92 29 12	2601	94 8 5	2610
	Pollux W.	59 9 42	2682	60 47 13	2688	62 24 39	2671	64 1 58	2675
	JUPITER W.	24 39 4	2615	26 17 38	2616	27 56 11	2618	29 34 42	2621
	Regulus W.	22 12 21	2595	23 51 22	2596	25 30 22	2599	27 9 19	2602
	Spica E.	31 51 55	2573	30 12 23	2585	28 33 7	2597	26 54 8	2610
	Antares E.	77 43 40	2600	76 4 45	2609	74 26 2	2618	72 47 32	2627
26	SATURN W.	102 19 38	2653	103 57 21	2662	105 34 53	2670	107 12 13	2679
	Pollux W.	72 6 45	2706	73 43 17	2713	75 19 40	2719	76 55 54	2727
	JUPITER W.	37 45 59	2645	39 23 53	2652	41 1 38	2656	42 39 14	2665
	Regulus W.	35 22 28	2630	37 0 42	2637	38 38 47	2644	40 16 42	2652
	Antares E.	64 38 14	2677	63 1 3	2687	61 24 6	2696	59 47 24	2710
27	Pollux W.	84 54 31	2767	86 29 42	2775	88 4 42	2785	89 39 30	2794
	JUPITER W.	50 44 48	2703	52 21 24	2711	53 57 49	2719	55 34 3	2729
	Regulus W.	48 23 44	2681	50 0 36	2688	51 37 18	2707	53 13 48	2716
	Antares E.	51 47 45	2770	50 12 38	2784	48 37 49	2798	47 3 18	2813
	$\alpha$ Aquilæ E.	101 12 58	3105	99 44 55	3109	98 16 57	3115	96 49 6	3121
28	Pollux W.	97 30 31	2841	99 4 6	2851	100 37 28	2861	102 10 37	2872
	JUPITER W.	63 32 21	2772	65 7 26	2781	66 42 19	2790	68 17 0	2798
	Regulus W.	61 13 28	2759	62 48 49	2769	64 23 58	2777	65 58 56	2786
	Antares E.	39 15 48	2808	37 43 26	2817	36 11 29	2830	34 40 0	2833
	$\alpha$ Aquilæ E.	89 32 0	3102	88 5 6	3172	86 38 24	3183	85 11 55	3194
29	JUPITER W.	76 7 30	2845	77 41 0	2854	79 14 18	2863	80 47 24	2872
	Regulus W.	73 50 48	2831	75 24 35	2841	76 58 10	2850	78 31 33	2859
	Spica W.	20 30 21	2890	22 2 53	2901	23 35 24	2903	25 7 52	2907
	$\alpha$ Aquilæ E.	78 3 3	3260	76 38 5	3275	75 13 24	3290	73 49 1	3306
30	JUPITER W.	88 30 2	2917	90 1 59	2927	91 33 44	2935	93 5 18	2943
	Regulus W.	86 15 37	2903	87 47 52	2912	89 19 55	2921	90 51 47	2929
	Spica W.	32 48 45	2924	34 20 34	2931	35 52 14	2938	37 23 45	2944
	$\alpha$ Aquilæ E.	66 52 9	3400	65 29 53	3422	64 8 1	3444	62 46 34	3468
	Fomalhaut E.	98 37 53	3298	97 13 28	3305	95 49 11	3302	94 25 2	3309

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
22	Pollux	W.	26° 51' 21"	9843	28° 24' 53"	9801	29° 59' 19"	9768	31° 34' 29"	9741
	Spica	E.	65 48 26	9395	64 4 44	9403	62 21 13	9410	60 37 53	9419
23	Sun	W.	116 8 4	9771	117 43 10	9780	119 18 4	9788	120 52 47	9797
	Aldebaran	W.	81 42 50	9445	83 25 20	9453	85 7 39	9461	86 49 47	9469
	SATURN	W.	69 5 19	9490	70 46 46	9497	72 28 3	9505	74 9 9	9513
	Pollux	W.	39 37 15	9667	41 14 39	9660	42 52 12	9655	44 29 52	9659
	Spica	E.	52 4 8	9460	50 21 58	9469	48 30 59	9477	46 58 13	9485
	Antares	E.	97 45 40	9502	96 4 30	9510	94 23 31	9517	92 42 42	9525
24	Sun	W.	128 43 31	9842	130 17 5	9851	131 50 27	9859	133 23 38	9869
	Aldebaran	W.	95 17 42	9508	96 58 44	9516	98 39 35	9525	100 20 14	9533
	SATURN	W.	82 31 56	9553	84 11 56	9560	85 51 46	9568	87 31 25	9577
	Pollux	W.	52 38 54	9650	54 16 41	9659	55 54 25	9656	57 32 6	9658
	Spica	E.	38 32 30	9531	36 52 0	9541	35 11 44	9551	33 31 42	9569
	Antares	E.	84 21 21	9586	82 41 39	9574	81 2 8	9589	79 22 48	9591
25	Aldebaran	W.	108 40 41	9574	110 20 12	9589	111 59 32	9590	113 38 41	9599
	SATURN	W.	95 46 47	9618	97 25 17	9636	99 3 36	9635	100 41 43	9644
	Pollux	W.	65 39 11	9681	67 16 16	9687	68 53 14	9692	70 30 4	9699
	JUPITER	W.	31 13 9	9694	32 51 31	9699	34 29 47	9633	36 7 57	9639
	Regulus	W.	28 48 11	9607	30 26 56	9619	32 5 34	9618	33 44 5	9623
	Spica	E.	25 15 27	9694	23 37 5	9640	21 59 4	9657	20 21 27	9677
	Antares	E.	71 9 14	9637	69 31 9	9646	67 53 17	9657	66 15 39	9666
26	SATURN	W.	108 49 21	9688	110 26 17	9696	112 3 0	9707	113 39 31	9716
	Pollux	W.	78 31 58	9735	80 7 52	9742	81 43 36	9750	83 19 9	9759
	JUPITER	W.	44 16 41	9679	45 53 58	9680	47 31 5	9687	49 8 2	9695
	Regulus	W.	41 54 27	9659	43 32 2	9666	45 9 27	9675	46 46 41	9683
	Antares	E.	58 10 57	9791	56 34 45	9733	54 58 49	9745	53 23 9	9757
27	Pollux	W.	91 14 6	9609	92 48 31	9611	94 22 44	9691	95 56 44	9631
	JUPITER	W.	57 10 5	9737	58 45 56	9745	60 21 36	9754	61 57 4	9763
	Regulus	W.	54 50 7	9794	56 26 15	9733	58 2 11	9749	59 37 55	9750
	Antares	E.	45 29 7	9698	43 55 16	9844	42 21 45	9860	40 48 35	9878
	α Aquilæ	E.	95 21 22	3198	93 53 47	3136	92 26 21	3144	90 59 5	3153
28	Pollux	W.	103 43 32	9692	105 16 14	9693	106 48 42	9904	108 20 56	9914
	JUPITER	W.	69 51 30	9608	71 25 48	9617	72 59 54	9696	74 33 48	9635
	Regulus	W.	67 33 42	9795	69 8 16	9804	70 42 38	9813	72 16 49	9822
	Antares	E.	33 9 1	9689	31 38 34	3017	30 8 42	3048	28 39 29	3082
	α Aquilæ	E.	83 45 39	3006	82 19 37	3919	80 53 50	3831	79 28 18	3946
29	JUPITER	W.	82 20 19	9881	83 53 2	9890	85 25 34	9899	86 57 54	9909
	Regulus	W.	80 4 45	9866	81 37 45	9876	83 10 34	9886	84 43 11	9894
	Spica	W.	26 40 15	9801	28 12 33	9806	29 44 44	9919	31 16 48	9917
	α Aquilæ	E.	72 24 57	3394	71 1 13	3342	69 37 50	3360	68 14 48	3380
30	JUPITER	W.	94 36 42	9959	96 7 55	9961	97 38 57	9969	99 9 49	9977
	Regulus	W.	92 23 29	9938	93 55 0	9946	95 26 21	9954	96 57 32	9963
	Spica	W.	38 55 8	9851	40 26 22	9858	41 57 27	9865	43 28 23	9872
	α Aquilæ	E.	61 25 34	3499	60 5 1	3518	58 44 57	3545	57 25 23	3574
	Fomalhaut	E.	93 1 1	3316	91 37 8	3323	90 13 23	3339	88 49 48	3340

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidercal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Frid.	1	<sup>h</sup> 2 <sup>m</sup> 35 <sup>s</sup> 13.94	9.547	N. 15° 12' 35.1"	+45.08	15' 54.14"	66.10	<sup>m</sup> 3 <sup>s</sup> 4.28	0.309
Sat.	2	2 39 3.33	9.570	15 30 29.4	44.45	15 53.90	66.18	3 11.42	0.296
SUN.	3	2 42 53.28	9.593	15 48 8.4	43.81	15 53.66	66.26	3 18.00	0.263
Mon.	4	2 46 43.80	9.617	16 5 31.8	+43.15	15 53.43	66.34	3 24.03	0.239
Tues.	5	2 50 34.91	9.641	16 22 39.3	42.48	15 53.20	66.42	3 29.47	0.215
Wed.	6	2 54 26.60	9.665	16 39 30.5	41.79	15 52.97	66.50	3 34.32	0.191
Thur.	7	2 58 18.87	9.690	16 56 5.2	+41.10	15 52.74	66.58	3 38.59	0.167
Frid.	8	3 2 11.72	9.715	17 12 23.1	40.39	15 52.52	66.66	3 42.28	0.142
Sat.	9	3 6 5.17	9.740	17 28 23.9	39.67	15 52.30	66.74	3 45.38	0.117
SUN.	10	3 9 59.22	9.765	17 44 7.1	+38.94	15 52.09	66.82	3 47.88	0.092
Mon.	11	3 13 53.85	9.790	17 59 32.6	38.20	15 51.87	66.90	3 49.79	0.067
Tues.	12	3 17 49.07	9.814	18 14 40.2	37.44	15 51.66	66.98	3 51.13	0.043
Wed.	13	3 21 44.87	9.838	18 29 29.6	+36.67	15 51.46	67.06	3 51.88	0.019
Thur.	14	3 25 41.26	9.862	18 44 0.2	35.88	15 51.26	67.14	3 52.04	0.005
Frid.	15	3 29 38.22	9.885	18 58 11.7	35.09	15 51.06	67.22	3 51.64	0.030
Sat.	16	3 33 35.74	9.908	19 12 4.2	+34.28	15 50.87	67.31	3 50.68	0.051
SUN.	17	3 37 33.62	9.931	19 25 37.2	33.46	15 50.68	67.39	3 49.16	0.074
Mon.	18	3 41 32.44	9.954	19 38 50.5	32.63	15 50.50	67.47	3 47.09	0.097
Tues.	19	3 45 31.60	9.976	19 51 43.7	+31.79	15 50.32	67.55	3 44.49	0.119
Wed.	20	3 49 31.29	9.998	20 4 16.6	30.94	15 50.14	67.63	3 41.37	0.141
Thur.	21	3 53 31.51	10.020	20 16 28.9	30.08	15 49.97	67.71	3 37.72	0.163
Frid.	22	3 57 32.25	10.042	20 28 20.4	+29.21	15 49.80	67.78	3 33.55	0.184
Sat.	23	4 1 33.49	10.063	20 39 50.8	28.33	15 49.64	67.86	3 28.87	0.205
SUN.	24	4 5 35.23	10.083	20 51 0.0	27.44	15 49.48	67.93	3 23.69	0.225
Mon.	25	4 9 37.47	10.103	21 1 47.8	+26.53	15 49.32	68.00	3 18.03	0.245
Tues.	26	4 13 40.19	10.123	21 12 13.7	25.62	15 49.16	68.07	3 11.89	0.265
Wed.	27	4 17 43.38	10.142	21 22 17.6	24.70	15 49.01	68.14	3 5.28	0.284
Thur.	28	4 21 47.02	10.161	21 31 59.4	+23.77	15 48.87	68.20	2 58.21	0.303
Frid.	29	4 25 51.11	10.180	21 41 18.9	22.83	15 48.72	68.26	2 50.69	0.322
Sat.	30	4 29 55.65	10.198	21 50 15.8	21.89	15 48.58	68.32	2 42.73	0.340
SUN.	31	4 34 0.63	10.216	21 58 50.0	20.94	15 48.43	68.38	2 34.33	0.358
Mon.	32	4 38 6.05	10.234	N. 22° 7' 1.3"	+19.98	15 48.29	68.43	2 25.49	0.376

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.  
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Frid.	1	2 <sup>h</sup> 35 <sup>m</sup> 14.43 <sup>s</sup>	9.546	N. 15° 12' 37.5"	+45.08	3 <sup>m</sup> 4.30 <sup>s</sup>	0.309	2 <sup>h</sup> 38 <sup>m</sup> 18.73 <sup>s</sup>
Sat.	2	2 39 3.84	9.571	15 30 31.9	44.45	3 11.44	0.286	2 42 15.28
SUN.	3	2 42 53.81	9.594	15 48 10.9	43.81	3 18.02	0.263	2 46 11.84
Mon.	4	2 46 44.35	9.618	16 5 34.3	+43.15	3 24.04	0.239	2 50 8.39
Tues.	5	2 50 35.47	9.642	16 22 41.8	42.48	3 29.46	0.215	2 54 4.95
Wed.	6	2 54 27.18	9.666	16 39 33.0	41.79	3 34.33	0.191	2 58 1.51
Thur.	7	2 58 19.46	9.690	16 56 7.7	+41.10	3 38.60	0.167	3 1 58.06
Frid.	8	3 2 12.32	9.715	17 12 25.6	40.39	3 42.29	0.142	3 5 54.61
Sat.	9	3 6 5.78	9.740	17 28 26.4	39.67	3 45.39	0.117	3 9 51.17
SUN.	10	3 9 59.84	9.765	17 44 9.6	+38.94	3 47.89	0.092	3 13 47.73
Mon.	11	3 13 54.48	9.790	17 59 35.1	38.20	3 49.80	0.067	3 17 44.28
Tues.	12	3 17 49.70	9.814	18 14 42.7	37.44	3 51.13	0.043	3 21 40.83
Wed.	13	3 21 45.51	9.838	18 29 32.0	+36.67	3 51.88	0.019	3 25 37.39
Thur.	14	3 25 41.90	9.862	18 44 2.5	35.88	3 52.04	0.005	3 29 33.94
Frid.	15	3 29 38.86	9.885	18 58 14.0	35.09	3 51.64	0.030	3 33 30.50
Sat.	16	3 33 36.38	9.908	19 12 6.4	+34.28	3 50.68	0.051	3 37 27.06
SUN.	17	3 37 34.45	9.931	19 25 39.4	33.46	3 49.16	0.074	3 41 23.61
Mon.	18	3 41 33.07	9.954	19 38 52.6	32.63	3 47.09	0.097	3 45 20.16
Tues.	19	3 45 32.23	9.976	19 51 45.7	+31.79	3 44.49	0.119	3 49 16.72
Wed.	20	3 49 31.91	9.998	20 4 18.5	30.94	3 41.36	0.141	3 53 13.27
Thur.	21	3 53 32.12	10.020	20 16 30.8	30.08	3 37.71	0.163	3 57 9.83
Frid.	22	3 57 32.85	10.041	20 28 22.2	+29.21	3 33.54	0.184	4 1 6.39
Sat.	23	4 1 34.08	10.062	20 39 52.5	28.33	3 28.86	0.205	4 5 2.94
SUN.	24	4 5 35.81	10.082	20 51 1.6	27.44	3 23.68	0.225	4 8 59.49
Mon.	25	4 9 38.03	10.102	21 1 49.3	+26.53	3 18.02	0.245	4 12 56.05
Tues.	26	4 13 40.73	10.122	21 12 15.1	25.62	3 11.88	0.265	4 16 52.61
Wed.	27	4 17 43.90	10.141	21 22 18.9	24.70	3 5.27	0.284	4 20 49.17
Thur.	28	4 21 47.52	10.160	21 32 0.6	+23.77	2 58.20	0.303	4 24 45.72
Frid.	29	4 25 51.59	10.179	21 41 20.0	22.83	2 50.68	0.322	4 28 42.27
Sat.	30	4 29 56.11	10.197	21 50 16.9	21.89	2 42.72	0.340	4 32 38.83
SUN.	31	4 34 1.07	10.215	21 58 51.0	20.94	2 34.32	0.358	4 36 35.39
Mon.	32	4 38 6.46	10.233	N. 22° 7' 2.1"	+19.98	2 25.48	0.376	4 40 31.94

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,  
+ 9°.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	121	41° 14' 52.2	14 35.9	145.36	+ 0.62	0.0035623	+ 45.2	21 <sup>h</sup> 18 <sup>m</sup> 11.30 <sup>s</sup>
2	122	42 13 0.0	12 43.6	145.29	0.69	0.0036703	44.9	21 14 15.39
3	123	43 11 6.3	10 49.8	145.23	0.70	0.0037777	44.6	21 10 19.48
4	124	44 9 11.2	8 54.6	145.17	+ 0.70	0.0038844	+ 44.3	21 6 23.57
5	125	45 7 14.7	6 57.9	145.11	0.66	0.0039903	43.9	21 2 27.66
6	126	46 5 16.7	4 59.8	145.06	0.61	0.0040952	43.5	20 58 31.75
7	127	47 3 17.4	3 0.4	145.00	+ 0.51	0.0041989	+ 42.9	20 54 35.85
8	128	48 1 16.8	0 59.7	144.95	0.41	0.0043012	42.3	20 50 39.94
9	129	48 59 14.9	58 57.7	144.90	0.28	0.0044020	41.6	20 46 44.03
10	130	49 57 11.7	56 54.3	144.84	+ 0.15	0.0045011	+ 40.9	20 42 48.12
11	131	50 55 7.1	54 49.6	144.78	+ 0.02	0.0045985	40.2	20 38 52.21
12	132	51 53 1.2	52 43.6	144.72	− 0.09	0.0046940	39.4	20 34 56.30
13	133	52 50 53.9	50 36.2	144.66	− 0.20	0.0047876	+ 38.6	20 31 0.39
14	134	53 48 45.1	48 27.3	144.60	0.28	0.0048791	37.7	20 27 4.48
15	135	54 46 34.9	46 16.9	144.54	0.34	0.0049686	36.9	20 23 8.57
16	136	55 44 23.2	44 5.1	144.48	− 0.38	0.0050560	+ 36.0	20 19 12.66
17	137	56 42 10.0	41 51.8	144.42	0.38	0.0051414	35.2	20 15 16.75
18	138	57 39 55.2	39 36.9	144.35	0.35	0.0052248	34.4	20 11 20.84
19	139	58 37 38.8	37 20.3	144.29	− 0.29	0.0053063	+ 33.6	20 7 24.94
20	140	59 35 20.8	35 2.1	144.22	0.21	0.0053860	32.9	20 3 29.03
21	141	60 33 1.3	32 42.5	144.15	− 0.10	0.0054640	32.2	19 59 33.12
22	142	61 30 40.2	30 21.3	144.08	+ 0.02	0.0055403	+ 31.5	19 55 37.21
23	143	62 28 17.5	27 58.5	144.02	0.16	0.0056151	30.9	19 51 41.30
24	144	63 25 53.4	25 34.2	143.96	0.30	0.0056884	30.3	19 47 45.39
25	145	64 23 27.9	23 8.5	143.90	+ 0.43	0.0057605	+ 29.7	19 43 49.48
26	146	65 21 1.1	20 41.6	143.85	0.56	0.0058315	29.2	19 39 53.57
27	147	66 18 33.0	18 13.4	143.80	0.66	0.0059013	28.7	19 35 57.66
28	148	67 16 3.6	15 43.8	143.75	+ 0.75	0.0059698	+ 28.3	19 32 1.75
29	149	68 13 33.0	13 13.0	143.71	0.81	0.0060371	27.9	19 28 5.84
30	150	69 11 1.5	10 41.3	143.67	0.83	0.0061033	27.4	19 24 9.93
31	151	70 8 29.1	8 8.8	143.63	0.83	0.0061684	26.9	19 20 14.02
32	152	71 5 55.8	5 35.4	143.59	+ 0.79	0.0062323	+ 26.3	19 16 18.10
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> .0.								
Diff. for 1 Hour, — 9 <sup>s</sup> .8296. (Table II.)								

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI- DIAMETER.

## HORIZONTAL PARALLAX.

## UPPER TRANSIT.

## AGE.

Noon.

Midnight.

Noon.

Diff. for  
1 Hour.

Midnight.

Diff. for  
1 Hour.Meridian of  
Greenwich.Diff. for  
1 Hour.

Noon.

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	14' 56.2	14' 53.5	54' 42.3	- 0.87	54' 32.4	- 0.76	<sup>h</sup> 14 <sup>m</sup> 12.2	<sup>m</sup> 2.00	<sup>d</sup> 16.3
2	14 51.3	14 49.4	54 24.0	0.63	54 17.2	0.49	15 0.1	1.99	17.3
3	14 48.1	14 47.2	54 12.3	- 0.33	54 9.3	- 0.16	15 47.6	1.97	18.3
4	14 47.0	14 47.4	54 8.5	+ 0.02	54 9.9	+ 0.22	16 34.6	1.94	19.3
5	14 48.4	14 50.2	54 13.7	0.42	54 20.0	0.62	17 20.9	1.91	20.3
6	14 52.6	14 55.6	54 28.8	0.83	54 40.1	1.05	18 6.6	1.90	21.3
7	14 59.4	15 3.8	54 53.9	+ 1.25	55 10.1	+ 1.45	18 52.1	1.90	22.3
8	15 8.9	15 14.5	55 28.7	1.64	55 49.4	1.81	19 37.8	1.92	23.3
9	15 20.7	15 27.2	56 12.0	1.95	56 36.2	2.07	20 24.4	1.97	24.3
10	15 34.2	15 41.4	57 1.7	+ 2.16	57 28.0	+ 2.21	21 12.5	2.05	25.3
11	15 48.6	15 55.8	57 54.6	2.21	58 21.0	2.17	22 2.8	2.16	26.3
12	16 2.8	16 9.4	58 46.7	2.07	59 10.9	1.93	22 56.0	2.28	27.3
13	16 15.4	16 20.8	59 33.1	+ 1.74	59 52.8	+ 1.51	23 52.2	2.41	28.3
14	16 25.3	16 28.8	60 9.4	1.23	60 22.4	0.93	<sup>d</sup> 0		29.3
15	16 31.4	16 32.8	60 31.7	+ 0.61	60 37.1	+ 0.28	0 51.3	2.51	0.9
16	16 33.2	16 32.5	60 38.4	- 0.05	60 35.8	- 0.37	1 52.2	2.55	1.9
17	16 30.8	16 28.2	60 29.6	0.66	60 20.0	0.92	2 53.2	2.53	2.9
18	16 24.8	16 20.7	60 7.5	1.14	59 52.6	1.32	3 53.0	2.44	3.9
19	16 16.1	16 11.1	59 35.7	- 1.47	59 17.3	- 1.58	4 50.1	2.32	4.9
20	16 5.8	16 0.4	58 57.8	1.65	58 37.8	1.68	5 44.3	2.19	5.9
21	15 54.8	15 49.3	58 17.5	1.69	57 57.2	1.67	6 35.6	2.09	6.9
22	15 43.9	15 38.6	57 37.3	- 1.63	57 17.9	- 1.59	7 24.7	2.01	7.9
23	15 33.5	15 28.6	56 59.1	1.54	56 41.0	1.47	8 12.3	1.96	8.9
24	15 23.9	15 19.4	56 23.8	1.40	56 7.4	1.33	8 59.0	1.94	9.9
25	15 15.2	15 11.2	55 51.9	- 1.26	55 37.3	- 1.18	9 45.5	1.94	10.9
26	15 7.5	15 4.0	55 23.5	1.11	55 10.7	1.03	10 32.3	1.96	11.9
27	15 0.7	14 57.7	54 58.8	0.96	54 47.8	0.87	11 19.5	1.98	12.9
28	14 55.0	14 52.6	54 37.8	- 0.79	54 28.8	- 0.71	12 7.2	1.99	13.9
29	14 50.4	14 48.6	54 20.9	0.61	54 14.2	0.51	12 55.0	1.99	14.9
30	14 47.1	14 46.0	54 8.8	0.39	54 4.8	- 0.27	13 42.8	1.98	15.9
31	14 45.3	14 45.1	54 2.2	- 0.15	54 1.3	0.00	14 30.1	1.95	16.9
32	14 45.3	14 46.1	54 2.2	+ 0.15	54 4.9	+ 0.31	15 16.6	1.92	17.9

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 1.					SUNDAY 3.				
0	16 22 58.34	2.0098	S. 16° 55' 29.9"	3.736	0	18 3 34.80	2.0850	S. 18° 17' 39.4"	0.389
1	16 25 4.33	2.0099	16 59 11.6	3.653	1	18 5 39.88	2.0849	18 17 17.1	0.413
2	16 27 10.33	2.1001	17 2 48.3	3.570	2	18 7 44.91	2.0835	18 16 49.8	0.498
3	16 29 16.34	2.1002	17 6 20.0	3.487	3	18 9 49.90	2.0827	18 16 17.4	0.583
4	16 31 22.35	2.1003	17 9 46.7	3.404	4	18 11 54.84	2.0819	18 15 39.9	0.667
5	16 33 28.37	2.1003	17 13 8.5	3.321	5	18 13 59.73	2.0812	18 14 57.4	0.750
6	16 35 34.39	2.1003	17 16 25.3	3.238	6	18 16 4.58	2.0804	18 14 9.9	0.833
7	16 37 40.41	2.1003	17 19 37.1	3.154	7	18 18 9.38	2.0795	18 13 17.4	0.917
8	16 39 46.43	2.1003	17 22 43.8	3.070	8	18 20 14.12	2.0786	18 12 19.8	1.001
9	16 41 52.45	2.1003	17 25 45.5	2.987	9	18 22 18.81	2.0777	18 11 17.2	1.085
10	16 43 58.47	2.1003	17 28 42.2	2.903	10	18 24 23.45	2.0769	18 10 9.6	1.168
11	16 46 4.49	2.1003	17 31 33.9	2.819	11	18 26 28.04	2.0760	18 8 57.0	1.251
12	16 48 10.50	2.1009	17 34 20.5	2.734	12	18 28 32.57	2.0751	18 7 39.5	1.334
13	16 50 16.51	2.1001	17 37 2.0	2.650	13	18 30 37.05	2.0742	18 6 17.0	1.417
14	16 52 22.51	2.0999	17 39 38.5	2.565	14	18 32 41.47	2.0732	18 4 49.5	1.500
15	16 54 28.50	2.0998	17 42 9.9	2.481	15	18 34 45.84	2.0723	18 3 17.0	1.583
16	16 56 34.49	2.0997	17 44 36.2	2.396	16	18 36 50.15	2.0714	18 1 39.6	1.664
17	16 58 40.47	2.0995	17 46 57.4	2.312	17	18 38 54.41	2.0705	17 59 57.3	1.746
18	17 0 46.43	2.0993	17 49 13.6	2.227	18	18 40 58.61	2.0696	17 58 10.1	1.829
19	17 2 52.38	2.0991	17 51 24.6	2.141	19	18 43 2.75	2.0685	17 56 17.9	1.911
20	17 4 58.32	2.0989	17 53 30.5	2.057	20	18 45 6.83	2.0675	17 54 20.8	1.993
21	17 7 4.25	2.0987	17 55 31.4	1.973	21	18 47 10.85	2.0666	17 52 18.9	2.073
22	17 9 10.16	2.0984	17 57 27.2	1.887	22	18 49 14.82	2.0656	17 50 12.1	2.154
23	17 11 16.05	2.0981	S. 17° 59' 17.8"	1.801	23	18 51 18.72	2.0645	S. 17° 48' 0.4"	2.236
SATURDAY 2.					MONDAY 4.				
0	17 13 21.93	2.0978	S. 18° 1' 3.3"	1.716	0	18 53 22.56	2.0635	S. 17° 45' 43.8"	2.317
1	17 15 27.79	2.0975	18 2 43.7	1.631	1	18 55 26.34	2.0625	17 43 22.4	2.397
2	17 17 33.63	2.0972	18 4 19.0	1.545	2	18 57 30.06	2.0615	17 40 56.2	2.477
3	17 19 39.45	2.0968	18 5 49.1	1.459	3	18 59 33.72	2.0604	17 38 25.1	2.557
4	17 21 45.24	2.0964	18 7 14.1	1.374	4	19 1 37.31	2.0593	17 35 49.3	2.637
5	17 23 51.01	2.0960	18 8 34.0	1.289	5	19 3 40.84	2.0583	17 33 8.7	2.717
6	17 25 56.76	2.0956	18 9 48.8	1.203	6	19 5 44.31	2.0572	17 30 23.3	2.797
7	17 28 2.48	2.0951	18 10 58.4	1.117	7	19 7 47.71	2.0562	17 27 33.1	2.876
8	17 30 8.17	2.0947	18 12 2.9	1.032	8	19 9 51.05	2.0552	17 24 38.2	2.954
9	17 32 13.84	2.0942	18 13 2.3	0.947	9	19 11 54.33	2.0541	17 21 38.6	3.033
10	17 34 19.48	2.0937	18 13 56.6	0.862	10	19 13 57.54	2.0530	17 18 34.2	3.111
11	17 36 25.09	2.0932	18 14 45.7	0.776	11	19 16 0.69	2.0520	17 15 25.2	3.189
12	17 38 30.67	2.0927	18 15 29.7	0.691	12	19 18 3.78	2.0509	17 12 11.5	3.267
13	17 40 36.22	2.0922	18 16 8.6	0.606	13	19 20 6.80	2.0498	17 8 53.1	3.345
14	17 42 41.73	2.0916	18 16 42.4	0.520	14	19 22 9.76	2.0487	17 5 30.1	3.422
15	17 44 47.21	2.0910	18 17 11.0	0.435	15	19 24 12.65	2.0477	17 2 2.4	3.500
16	17 46 52.65	2.0904	18 17 34.6	0.351	16	19 26 15.48	2.0466	16 58 30.1	3.577
17	17 48 58.06	2.0898	18 17 53.1	0.265	17	19 28 18.24	2.0455	16 54 53.2	3.654
18	17 51 3.43	2.0892	18 18 6.4	0.179	18	19 30 20.94	2.0444	16 51 11.6	3.731
19	17 53 8.76	2.0885	18 18 14.6	0.094	19	19 32 23.57	2.0433	16 47 25.4	3.808
20	17 55 14.05	2.0878	18 18 17.7	-0.009	20	19 34 26.14	2.0422	16 43 34.7	3.883
21	17 57 19.30	2.0872	18 18 15.7	+0.075	21	19 36 28.65	2.0412	16 39 39.5	3.958
22	17 59 24.51	2.0865	18 18 8.7	+0.159	22	19 38 31.09	2.0402	16 35 39.8	4.033
23	18 1 29.68	2.0857	18 17 56.6	0.244	23	19 40 33.47	2.0391	16 31 35.6	4.108
24	18 3 34.80	2.0850	S. 18° 17' 39.4"	0.329	24	19 42 35.78	2.0380	S. 16° 27' 26.9"	4.183



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 5.					THURSDAY 7.				
0	19 42 35.78	2.0380	S. 16° 27' 26.9"	4.183	0	21 19 24.16	2.0090	S. 11° 46' 35.1"	7.387
1	19 44 38.03	2.0370	16 23 13.7	4.368	1	21 21 24.27	2.0017	11 39 10.1	7.445
2	19 46 40.22	2.0360	16 18 56.0	4.399	2	21 23 24.36	2.0014	11 31 41.7	7.509
3	19 48 42.35	2.0349	16 14 33.9	4.405	3	21 25 24.44	2.0019	11 24 9.8	7.560
4	19 50 44.41	2.0338	16 10 7.4	4.478	4	21 27 24.51	2.0011	11 16 34.5	7.617
5	19 52 46.41	2.0398	16 5 36.5	4.552	5	21 29 24.57	2.0010	11 8 55.8	7.673
6	19 54 48.35	2.0318	16 1 1.2	4.695	6	21 31 24.63	2.0009	11 1 13.8	7.726
7	19 56 50.23	2.0308	15 56 21.5	4.697	7	21 33 24.68	2.0008	10 53 28.4	7.784
8	19 58 52.05	2.0296	15 51 37.5	4.770	8	21 35 24.73	2.0007	10 45 39.7	7.839
9	20 0 53.81	2.0287	15 46 49.1	4.843	9	21 37 24.77	2.0007	10 37 47.7	7.893
10	20 2 55.50	2.0277	15 41 56.4	4.914	10	21 39 24.82	2.0008	10 29 52.5	7.948
11	20 4 57.14	2.0268	15 36 59.4	4.965	11	21 41 24.87	2.0008	10 21 54.0	8.003
12	20 6 58.72	2.0258	15 31 58.2	5.056	12	21 43 24.92	2.0009	10 13 52.3	8.055
13	20 9 0.24	2.0249	15 26 52.7	5.137	13	21 45 24.98	2.0011	10 5 47.4	8.107
14	20 11 1.71	2.0240	15 21 42.9	5.198	14	21 47 25.05	2.0019	9 57 39.4	8.160
15	20 13 3.12	2.0230	15 16 28.9	5.268	15	21 49 25.13	2.0014	9 49 28.2	8.219
16	20 15 4.47	2.0221	15 11 10.7	5.337	16	21 51 25.22	2.0016	9 41 13.9	8.283
17	20 17 5.77	2.0212	15 5 48.4	5.407	17	21 53 25.32	2.0018	9 32 56.6	8.314
18	20 19 7.01	2.0203	15 0 21.9	5.476	18	21 55 25.44	2.0022	9 24 36.2	8.366
19	20 21 8.20	2.0194	14 54 51.3	5.545	19	21 57 25.58	2.0025	9 16 12.7	8.417
20	20 23 9.34	2.0185	14 49 16.5	5.614	20	21 59 25.74	2.0028	9 7 46.2	8.466
21	20 25 10.42	2.0176	14 43 37.6	5.689	21	22 1 25.92	2.0039	8 59 16.8	8.514
22	20 27 11.45	2.0168	14 37 54.7	5.749	22	22 3 26.13	2.0037	8 50 44.5	8.569
23	20 29 12.43	2.0160	S. 14 32 7.7	5.817	23	22 5 26.36	2.0041	S. 8 42 9.3	8.611
WEDNESDAY 6.					FRIDAY 8.				
0	20 31 13.37	2.0159	S. 14 26 16.6	5.885	0	22 7 26.62	2.0047	S. 8 33 31.2	8.659
1	20 33 14.26	2.0144	14 20 21.5	5.969	1	22 9 26.92	2.0059	8 24 50.2	8.707
2	20 35 15.10	2.0137	14 14 22.4	6.018	2	22 11 27.25	2.0057	8 16 6.4	8.753
3	20 37 15.90	2.0129	14 8 19.4	6.063	3	22 13 27.61	2.0063	8 7 19.8	8.800
4	20 39 16.65	2.0129	14 2 12.4	6.149	4	22 15 28.01	2.0070	7 58 30.4	8.846
5	20 41 17.36	2.0114	13 56 1.5	6.215	5	22 17 28.45	2.0077	7 49 38.3	8.891
6	20 43 18.02	2.0107	13 49 46.6	6.281	6	22 19 28.94	2.0085	7 40 43.5	8.936
7	20 45 18.64	2.0100	13 43 27.8	6.345	7	22 21 29.47	2.0099	7 31 46.0	8.981
8	20 47 19.22	2.0094	13 37 5.2	6.409	8	22 23 30.05	2.0101	7 22 45.8	9.025
9	20 49 19.77	2.0088	13 30 38.8	6.473	9	22 25 30.68	2.0109	7 13 43.0	9.067
10	20 51 20.28	2.0089	13 24 8.5	6.537	10	22 27 31.36	2.0118	7 4 37.7	9.110
11	20 53 20.75	2.0075	13 17 34.4	6.600	11	22 29 32.10	2.0127	6 55 29.8	9.153
12	20 55 21.18	2.0069	13 10 56.5	6.662	12	22 31 32.89	2.0137	6 46 19.3	9.196
13	20 57 21.58	2.0064	13 4 14.9	6.725	13	22 33 33.74	2.0147	6 37 6.3	9.237
14	20 59 21.95	2.0058	12 57 29.5	6.787	14	22 35 34.66	2.0158	6 27 50.9	9.277
15	21 1 22.28	2.0053	12 50 40.4	6.849	15	22 37 35.64	2.0169	6 18 33.1	9.317
16	21 3 22.59	2.0049	12 43 47.6	6.911	16	22 39 36.69	2.0181	6 9 12.9	9.357
17	21 5 22.87	2.0044	12 36 51.1	6.972	17	22 41 37.81	2.0192	5 59 50.3	9.396
18	21 7 23.12	2.0040	12 29 51.0	7.039	18	22 43 38.99	2.0204	5 50 25.4	9.434
19	21 9 23.35	2.0036	12 22 47.2	7.099	19	22 45 40.25	2.0217	5 40 58.2	9.479
20	21 11 23.55	2.0039	12 15 39.9	7.159	20	22 47 41.59	2.0230	5 31 28.7	9.510
21	21 13 23.73	2.0028	12 8 29.0	7.211	21	22 49 43.01	2.0243	5 21 57.0	9.547
22	21 15 23.89	2.0025	12 1 14.6	7.270	22	22 51 44.51	2.0257	5 12 23.1	9.583
23	21 17 24.03	2.0022	11 53 56.6	7.329	23	22 53 46.10	2.0272	5 2 47.0	9.619
24	21 19 24.16	2.0020	S. 11 46 35.1	7.387	24	22 55 47.77	2.0286	S. 4 53 8.8	9.654

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 9.					MONDAY 11.				
0	22 55 47.77	2.0986	S. 4 53' 6.8"	9.684	0	0 35 43.70	2.1527	N. 3 17' 37.9"	10.495
1	22 57 49.53	2.0308	4 43 28.5	9.686	1	0 37 52.97	2.1563	3 28 7.5	10.491
2	22 59 51.39	2.0317	4 33 46.2	9.792	2	0 40 2.46	2.1601	3 38 36.8	10.486
3	23 1 53.34	2.0333	4 24 1.9	9.755	3	0 42 12.18	2.1639	3 49 5.8	10.480
4	23 3 55.39	2.0350	4 14 15.6	9.787	4	0 44 22.13	2.1677	3 59 34.4	10.474
5	23 5 57.54	2.0367	4 4 27.4	9.880	5	0 46 32.31	2.1715	4 10 2.7	10.467
6	23 7 59.79	2.0384	3 54 37.2	9.859	6	0 48 42.71	2.1753	4 20 30.5	10.459
7	23 10 2.15	2.0402	3 44 45.2	9.899	7	0 50 53.34	2.1793	4 30 57.8	10.449
8	23 12 4.62	2.0420	3 34 51.4	9.919	8	0 53 4.22	2.1833	4 41 24.4	10.437
9	23 14 7.19	2.0438	3 24 55.8	9.942	9	0 55 15.34	2.1873	4 51 50.3	10.425
10	23 16 9.88	2.0458	3 14 58.4	9.971	10	0 57 26.70	2.1913	5 2 15.4	10.413
11	23 18 12.69	2.0478	3 4 59.3	9.996	11	0 59 38.30	2.1954	5 12 39.8	10.399
12	23 20 15.62	2.0498	2 54 58.6	10.036	12	1 1 50.15	2.1996	5 23 3.3	10.383
13	23 22 18.67	2.0519	2 44 56.2	10.053	13	1 4 2.25	2.2037	5 33 25.8	10.367
14	23 24 21.85	2.0540	2 34 52.2	10.079	14	1 6 14.60	2.2079	5 43 47.3	10.350
15	23 26 25.15	2.0561	2 24 46.7	10.104	15	1 8 27.20	2.2121	5 54 7.8	10.332
16	23 28 28.58	2.0583	2 14 39.7	10.128	16	1 10 40.05	2.2163	6 4 27.1	10.312
17	23 30 32.15	2.0606	2 4 31.3	10.152	17	1 12 53.15	2.2205	6 14 45.2	10.292
18	23 32 35.85	2.0629	1 54 21.5	10.175	18	1 15 6.51	2.2248	6 25 2.1	10.270
19	23 34 39.69	2.0652	1 44 10.3	10.197	19	1 17 20.14	2.2293	6 35 17.6	10.247
20	23 36 43.67	2.0675	1 33 57.8	10.220	20	1 19 34.03	2.2337	6 45 31.7	10.222
21	23 38 47.79	2.0699	1 23 43.9	10.242	21	1 21 48.18	2.2381	6 55 44.2	10.195
22	23 40 52.06	2.0724	1 13 28.8	10.262	22	1 24 2.60	2.2426	7 5 55.1	10.168
23	23 42 56.48	2.0750	S. 1 3 12.5	10.281	23	1 26 17.29	2.2471	N. 7 16 4.4	10.141
SUNDAY 10.					TUESDAY 12.				
0	23 45 1.06	2.0776	S. 0 52 55.1	10.299	0	1 28 32.25	2.2516	N. 7 26 12.1	10.113
1	23 47 5.79	2.0802	0 42 36.6	10.317	1	1 30 47.48	2.2561	7 36 18.0	10.089
2	23 49 10.68	2.0828	0 32 17.0	10.335	2	1 33 2.98	2.2607	7 46 22.0	10.060
3	23 51 15.72	2.0854	0 21 56.4	10.351	3	1 35 18.76	2.2653	7 56 24.0	10.017
4	23 53 20.93	2.0880	0 11 34.9	10.366	4	1 37 34.81	2.2698	8 6 24.0	9.983
5	23 55 26.31	2.0911	S. 0 1 12.5	10.381	5	1 39 51.14	2.2745	8 16 22.0	9.949
6	23 57 31.86	2.0939	N. 0 9 10.8	10.395	6	1 42 7.75	2.2792	8 26 17.9	9.912
7	23 59 37.58	2.0968	0 19 34.9	10.408	7	1 44 24.64	2.2838	8 36 11.5	9.874
8	0 1 43.47	2.0997	0 29 59.8	10.420	8	1 46 41.81	2.2885	8 46 2.8	9.835
9	0 3 49.54	2.1027	0 40 25.3	10.431	9	1 48 59.26	2.2933	8 55 51.7	9.795
10	0 5 55.79	2.1057	0 50 51.5	10.442	10	1 51 17.00	2.2981	9 5 38.2	9.753
11	0 8 2.22	2.1088	1 1 18.4	10.452	11	1 53 35.03	2.3029	9 15 22.1	9.710
12	0 10 8.84	2.1119	1 11 45.8	10.461	12	1 55 53.34	2.3078	9 25 3.4	9.666
13	0 12 15.65	2.1151	1 22 13.7	10.469	13	1 58 11.93	2.3124	9 34 42.0	9.620
14	0 14 22.65	2.1183	1 32 42.1	10.476	14	2 0 30.83	2.3172	9 44 17.8	9.573
15	0 16 29.84	2.1215	1 43 10.8	10.482	15	2 2 50.00	2.3219	9 53 50.8	9.525
16	0 18 37.23	2.1247	1 53 39.9	10.487	16	2 5 9.46	2.3268	10 3 20.8	9.475
17	0 20 44.81	2.1280	2 4 9.2	10.491	17	2 7 29.22	2.3317	10 12 47.8	9.425
18	0 22 52.59	2.1314	2 14 38.8	10.495	18	2 9 49.27	2.3366	10 22 11.8	9.373
19	0 25 0.58	2.1349	2 25 8.6	10.497	19	2 12 9.61	2.3414	10 31 32.6	9.319
20	0 27 8.78	2.1384	2 35 38.5	10.498	20	2 14 30.24	2.3462	10 40 50.1	9.264
21	0 29 17.19	2.1419	2 46 8.4	10.498	21	2 16 51.16	2.3511	10 50 4.3	9.208
22	0 31 25.81	2.1455	2 56 38.3	10.498	22	2 19 12.37	2.3560	10 59 15.1	9.151
23	0 33 34.65	2.1491	3 7 8.1	10.497	23	2 21 33.88	2.3609	11 8 22.4	9.099
24	0 35 43.70	2.1527	N. 3 17 37.9	10.495	24	2 23 55.68	2.3658	N. 11 17 26.2	9.039

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 13.					FRIDAY 15.				
0	2 23 55.68	2.3658	N.11 17' 26.2	9.039	0	4 22 44.31	2.5688	N.16 56' 42.9	4.634
1	2 26 17.77	2.3707	11 26 26.3	8.971	1	4 25 18.52	2.5717	17 1 17.4	4.515
2	2 28 40.16	2.3756	11 35 22.7	8.906	2	4 27 52.91	2.5745	17 5 44.7	4.395
3	2 31 2.84	2.3804	11 44 15.2	8.843	3	4 30 27.46	2.5779	17 10 4.8	4.275
4	2 33 25.81	2.3853	11 53 3.8	8.778	4	4 33 2.17	2.5797	17 14 17.7	4.153
5	2 35 49.07	2.3902	12 1 48.5	8.719	5	4 35 37.03	2.5822	17 18 23.2	4.030
6	2 38 12.63	2.3951	12 10 29.2	8.643	6	4 38 12.03	2.5846	17 22 21.3	3.907
7	2 40 36.48	2.3999	12 19 5.7	8.573	7	4 40 47.18	2.5870	17 26 12.0	3.783
8	2 43 0.62	2.4047	12 27 38.0	8.509	8	4 43 22.47	2.5892	17 29 55.3	3.659
9	2 45 25.05	2.4095	12 36 5.9	8.439	9	4 45 57.89	2.5914	17 33 31.1	3.534
10	2 47 49.76	2.4143	12 44 29.5	8.356	10	4 48 33.44	2.5934	17 36 59.4	3.408
11	2 50 14.76	2.4191	12 52 48.7	8.282	11	4 51 9.10	2.5953	17 40 20.1	3.282
12	2 52 40.05	2.4239	13 1 3.3	8.205	12	4 53 44.87	2.5971	17 43 33.2	3.154
13	2 55 5.63	2.4287	13 9 13.3	8.127	13	4 56 20.75	2.5989	17 46 38.6	3.027
14	2 57 31.49	2.4334	13 17 18.6	8.048	14	4 58 56.74	2.6007	17 49 36.4	2.900
15	2 59 57.64	2.4382	13 25 19.1	7.968	15	5 1 32.83	2.6023	17 52 26.5	2.770
16	3 2 24.07	2.4428	13 33 14.8	7.887	16	5 4 9.01	2.6037	17 55 8.8	2.641
17	3 4 50.78	2.4474	13 41 5.6	7.804	17	5 6 45.27	2.6050	17 57 43.4	2.519
18	3 7 17.76	2.4520	13 48 51.3	7.719	18	5 9 21.61	2.6062	18 0 10.2	2.392
19	3 9 45.02	2.4567	13 56 31.9	7.634	19	5 11 58.02	2.6074	18 2 29.2	2.251
20	3 12 12.56	2.4613	14 4 7.4	7.547	20	5 14 34.50	2.6085	18 4 40.3	2.119
21	3 14 40.37	2.4658	14 11 37.6	7.459	21	5 17 11.04	2.6094	18 6 43.5	1.988
22	3 17 8.45	2.4703	14 19 2.5	7.370	22	5 19 47.63	2.6102	18 8 38.8	1.857
23	3 19 36.80	2.4748	N.14 26 22.0	7.279	23	5 22 24.27	2.6110	N.18 10 26.3	1.726
THURSDAY 14.					SATURDAY 16.				
0	3 22 5.42	2.4792	N.14 33 36.0	7.187	0	5 25 0.95	2.6118	N.18 12 5.9	1.593
1	3 24 34.30	2.4835	14 40 44.5	7.094	1	5 27 37.66	2.6121	18 13 37.5	1.461
2	3 27 3.44	2.4879	14 47 47.3	6.999	2	5 30 14.40	2.6128	18 15 1.2	1.328
3	3 29 32.85	2.4922	14 54 44.4	6.903	3	5 32 51.17	2.6129	18 16 16.9	1.195
4	3 32 2.51	2.4964	15 1 35.7	6.807	4	5 35 27.95	2.6131	18 17 24.6	1.062
5	3 34 32.42	2.5006	15 8 21.2	6.709	5	5 38 4.74	2.6132	18 18 24.3	0.928
6	3 37 2.58	2.5047	15 15 0.8	6.610	6	5 40 41.53	2.6132	18 19 16.0	0.795
7	3 39 32.99	2.5088	15 21 34.4	6.509	7	5 43 18.32	2.6131	18 19 59.7	0.662
8	3 42 3.64	2.5129	15 28 1.9	6.407	8	5 45 55.10	2.6128	18 20 35.4	0.528
9	3 44 34.54	2.5169	15 34 23.3	6.305	9	5 48 31.86	2.6125	18 21 3.1	0.396
10	3 47 5.67	2.5208	15 40 38.5	6.201	10	5 51 8.60	2.6121	18 21 22.9	0.263
11	3 49 37.04	2.5247	15 46 47.4	6.095	11	5 53 45.31	2.6115	18 21 34.7	+ 0.130
12	3 52 8.64	2.5285	15 52 49.9	5.989	12	5 56 21.98	2.6108	18 21 36.5	- 0.003
13	3 54 40.46	2.5322	15 58 46.0	5.882	13	5 58 58.61	2.6101	18 21 34.3	0.137
14	3 57 12.50	2.5359	16 4 35.7	5.773	14	6 1 35.19	2.6092	18 21 22.1	0.269
15	3 59 44.77	2.5396	16 10 18.8	5.663	15	6 4 11.72	2.6083	18 21 2.0	0.409
16	4 2 17.25	2.5431	16 15 55.3	5.553	16	6 6 48.19	2.6073	18 20 33.9	0.535
17	4 4 49.94	2.5466	16 21 25.2	5.442	17	6 9 24.59	2.6061	18 19 57.8	0.667
18	4 7 22.84	2.5500	16 26 48.4	5.330	18	6 12 0.92	2.6048	18 19 13.8	0.799
19	4 9 55.94	2.5533	16 32 4.8	5.216	19	6 14 37.17	2.6034	18 18 21.9	0.931
20	4 12 29.24	2.5566	16 37 14.3	5.101	20	6 17 13.33	2.6019	18 17 22.1	1.062
21	4 15 2.73	2.5597	16 42 16.9	4.986	21	6 19 49.40	2.6004	18 16 14.4	1.193
22	4 17 36.41	2.5628	16 47 12.6	4.870	22	6 22 25.38	2.5987	18 14 58.9	1.324
23	4 20 10.27	2.5658	16 52 1.3	4.752	23	6 25 1.25	2.5969	18 13 35.5	1.455
24	4 22 44.31	2.5688	N.16 56 42.9	4.634	24	6 27 37.01	2.5950	N.18 12 4.3	1.585

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 17.					TUESDAY 19.				
0	h m s	s	N. 18° 12' 4.3"	1.585	0	h m s	s	N. 14° 39' 10.0"	6.948
1	6 27 37.01	2.5950	18 10 25.3	1.714	1	8 28 32.03	2.4908	14 32 10.9	7.029
2	6 30 12.65	2.5931	18 8 38.6	1.843	2	8 30 57.14	2.4169	14 25 6.6	7.115
3	6 32 48.18	2.5911	18 6 44.1	1.973	3	8 33 21.97	2.4114	14 17 57.1	7.200
4	6 35 23.58	2.5890	18 4 41.9	2.100	4	8 35 46.51	2.4067	14 10 42.6	7.283
5	6 37 58.85	2.5867	18 2 32.1	2.227	5	8 38 10.77	2.4020	14 3 23.1	7.365
6	6 40 33.98	2.5843	18 0 14.6	2.355	6	8 40 34.75	2.3972	13 55 58.8	7.446
7	6 43 8.97	2.5819	17 57 49.5	2.482	7	8 42 58.44	2.3925	13 48 29.6	7.527
8	6 45 43.81	2.5794	17 55 16.8	2.607	8	8 45 21.85	2.3877	13 40 55.6	7.608
9	6 48 18.50	2.5768	17 52 36.6	2.733	9	8 47 44.97	2.3830	13 33 16.9	7.683
10	6 50 53.03	2.5742	17 49 48.9	2.857	10	8 50 7.81	2.3783	13 25 33.6	7.760
11	6 53 27.40	2.5714	17 46 53.8	2.981	11	8 52 30.37	2.3736	13 17 45.7	7.836
12	6 56 1.60	2.5685	17 43 51.2	3.105	12	8 54 52.64	2.3688	13 9 53.3	7.910
13	6 58 35.62	2.5655	17 40 41.2	3.227	13	8 57 14.63	2.3641	13 1 56.5	7.983
14	7 1 9.46	2.5625	17 37 23.9	3.348	14	8 59 36.33	2.3593	12 53 55.3	8.055
15	7 3 43.12	2.5595	17 33 59.4	3.469	15	9 1 57.75	2.3546	12 45 49.9	8.125
16	7 6 16.60	2.5563	17 30 27.6	3.590	16	9 4 18.89	2.3499	12 37 40.3	8.195
17	7 8 49.88	2.5531	17 26 48.6	3.710	17	9 6 39.74	2.3452	12 29 26.5	8.264
18	7 11 22.97	2.5498	17 23 2.4	3.829	18	9 9 9.31	2.3405	12 21 8.6	8.332
19	7 13 55.86	2.5464	17 19 9.1	3.947	19	9 11 20.60	2.3358	12 12 46.7	8.398
20	7 16 28.54	2.5429	17 15 8.8	4.063	20	9 13 40.61	2.3312	12 4 20.9	8.463
21	7 19 1.01	2.5394	17 11 1.5	4.179	21	9 16 0.34	2.3265	11 55 51.3	8.525
22	7 21 33.27	2.5358	17 6 47.3	4.295	22	9 18 19.79	2.3218	11 47 17.9	8.588
23	7 24 5.31	2.5322	N. 17° 2 26.1	4.410	23	9 20 38.96	2.3172	N. 11° 38 40.7	8.650
24	7 26 37.13	2.5285				9 22 57.85	2.3126		
MONDAY 18.					WEDNESDAY 20.				
0	7 29 8.73	2.5247	N. 16° 57 58.1	4.523	0	9 25 16.47	2.3080	N. 11° 29 59.9	8.710
1	7 31 40.10	2.5209	16 53 23.3	4.636	1	9 27 34.81	2.3034	11 21 15.5	8.769
2	7 34 11.24	2.5170	16 48 41.8	4.747	2	9 29 52.88	2.2989	11 12 27.6	8.827
3	7 36 42.14	2.5130	16 43 53.7	4.857	3	9 32 10.68	2.2943	11 3 36.3	8.884
4	7 39 12.80	2.5090	16 38 58.9	4.967	4	9 34 28.20	2.2898	10 54 41.6	8.940
5	7 41 43.22	2.5050	16 33 57.6	5.076	5	9 36 45.45	2.2853	10 45 43.5	8.995
6	7 44 13.40	2.5009	16 28 49.8	5.184	6	9 39 2.44	2.2808	10 36 42.2	9.048
7	7 46 43.33	2.4968	16 23 35.5	5.291	7	9 41 19.16	2.2764	10 27 37.7	9.100
8	7 49 13.01	2.4926	16 18 14.9	5.396	8	9 43 35.61	2.2720	10 18 30.2	9.151
9	7 51 42.44	2.4883	16 12 48.0	5.501	9	9 45 51.80	2.2677	10 9 19.6	9.203
10	7 54 11.61	2.4840	16 7 14.8	5.605	10	9 48 7.73	2.2633	10 0 6.0	9.251
11	7 56 40.52	2.4797	16 1 35.4	5.707	11	9 50 23.40	2.2590	9 50 49.5	9.298
12	7 59 9.18	2.4754	15 55 49.9	5.809	12	9 52 38.81	2.2547	9 41 30.2	9.345
13	8 1 37.57	2.4710	15 49 58.3	5.910	13	9 54 53.97	2.2505	9 32 8.1	9.391
14	8 4 5.70	2.4666	15 44 0.7	6.009	14	9 57 8.87	2.2462	9 22 43.3	9.435
15	8 6 33.56	2.4621	15 37 57.2	6.107	15	9 59 23.51	2.2419	9 13 15.9	9.478
16	8 9 1.15	2.4576	15 31 47.9	6.203	16	10 1 37.90	2.2378	9 3 45.9	9.521
17	8 11 28.47	2.4531	15 25 32.8	6.300	17	10 3 52.05	2.2337	8 54 13.4	9.563
18	8 13 55.52	2.4485	15 19 11.9	6.396	18	10 6 5.95	2.2297	8 44 38.5	9.603
19	8 16 22.29	2.4439	15 12 45.3	6.490	19	10 8 19.61	2.2257	8 35 1.2	9.641
20	8 18 48.79	2.4394	15 6 13.1	6.582	20	10 10 33.03	2.2216	8 25 21.6	9.679
21	8 21 15.02	2.4348	14 59 35.5	6.673	21	10 12 46.20	2.2176	8 15 39.7	9.717
22	8 23 40.97	2.4303	14 52 52.4	6.763	22	10 14 59.14	2.2137	8 5 55.6	9.753
23	8 26 6.64	2.4255	14 46 3.9	6.853	23	10 17 11.84	2.2098	7 56 9.4	9.787
24	8 28 32.03	2.4208	N. 14° 39 10.0	6.942	24	10 19 24.31	2.2059	N. 7° 46 21.2	9.820

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 21.					SATURDAY 23.				
0	<sup>h</sup> 10 <sup>m</sup> 19 <sup>s</sup> 24.31	2.9050	N. 7° 46' 21.2"	9.890	0	<sup>h</sup> 12 <sup>m</sup> 1 <sup>s</sup> 41.02	2.0735	S. 0° 25' 24.1"	10.318
1	10 21 36.55	2.9091	7 36 31.0	9.883	1	12 3 45.38	2.0718	0 35 42.9	10.308
2	10 23 48.56	2.1983	7 26 38.8	9.886	2	12 5 49.64	2.0709	0 46 1.0	10.297
3	10 26 0.35	2.1946	7 16 44.7	9.916	3	12 7 53.81	2.0687	0 56 18.5	10.285
4	10 28 11.91	2.1909	7 6 48.9	9.945	4	12 9 57.89	2.0679	1 6 35.2	10.271
5	10 30 23.26	2.1873	6 56 51.3	9.974	5	12 12 1.88	2.0658	1 16 51.0	10.256
6	10 32 34.39	2.1837	6 46 52.0	10.009	6	12 14 5.79	2.0644	1 27 5.9	10.241
7	10 34 45.30	2.1801	6 36 51.1	10.038	7	12 16 9.61	2.0631	1 37 19.9	10.226
8	10 36 56.00	2.1766	6 26 48.6	10.054	8	12 18 13.36	2.0618	1 47 33.0	10.210
9	10 39 6.49	2.1731	6 16 44.6	10.079	9	12 20 17.03	2.0606	1 57 45.1	10.193
10	10 41 16.77	2.1697	6 6 39.1	10.103	10	12 22 20.62	2.0592	2 7 56.2	10.175
11	10 43 26.85	2.1669	5 56 32.2	10.125	11	12 24 24.14	2.0581	2 18 6.1	10.156
12	10 45 36.72	2.1638	5 46 24.1	10.146	12	12 26 27.59	2.0570	2 28 14.9	10.137
13	10 47 46.39	2.1596	5 36 14.7	10.167	13	12 28 30.98	2.0559	2 38 22.5	10.117
14	10 49 55.87	2.1564	5 26 4.0	10.187	14	12 30 34.30	2.0548	2 48 28.9	10.096
15	10 52 5.16	2.1533	5 15 52.2	10.206	15	12 32 37.56	2.0538	2 58 34.0	10.074
16	10 54 14.25	2.1499	5 5 30.3	10.224	16	12 34 40.76	2.0528	3 8 37.8	10.052
17	10 56 23.15	2.1468	4 55 25.3	10.241	17	12 36 43.90	2.0519	3 18 40.2	10.028
18	10 58 31.87	2.1437	4 45 10.4	10.256	18	12 38 46.99	2.0511	3 28 41.2	10.004
19	11 0 40.40	2.1407	4 34 54.6	10.271	19	12 40 50.03	2.0502	3 38 40.7	9.980
20	11 2 48.76	2.1378	4 24 37.9	10.286	20	12 42 53.02	2.0494	3 48 38.8	9.956
21	11 4 56.94	2.1348	4 14 20.3	10.299	21	12 44 55.96	2.0487	3 58 35.4	9.930
22	11 7 4.94	2.1319	4 4 2.0	10.311	22	12 46 58.86	2.0480	4 8 30.4	9.903
23	11 9 12.77	2.1289	N. 3 53 43.0	10.322	23	12 49 1.72	2.0473	S. 4 18 23.7	9.875
FRIDAY 22.					SUNDAY 24.				
0	11 11 20.44	2.1264	N. 3 43 23.4	10.332	0	12 51 4.53	2.0466	S. 4 28 15.4	9.847
1	11 13 27.94	2.1237	3 33 3.2	10.341	1	12 53 7.31	2.0460	4 38 5.4	9.818
2	11 15 35.28	2.1209	3 22 42.5	10.350	2	12 55 10.05	2.0454	4 47 53.6	9.788
3	11 17 42.45	2.1182	3 12 21.2	10.358	3	12 57 12.76	2.0449	4 57 40.0	9.758
4	11 19 49.46	2.1156	3 1 59.5	10.364	4	12 59 15.44	2.0444	5 7 24.6	9.727
5	11 21 56.32	2.1131	2 51 37.5	10.370	5	13 1 18.09	2.0440	5 17 7.3	9.696
6	11 24 3.03	2.1106	2 41 15.1	10.376	6	13 3 20.72	2.0436	5 26 48.1	9.664
7	11 26 9.59	2.1081	2 30 52.4	10.380	7	13 5 23.32	2.0432	5 36 27.0	9.631
8	11 28 16.00	2.1057	2 20 29.5	10.382	8	13 7 25.90	2.0428	5 46 3.8	9.597
9	11 30 22.27	2.1033	2 10 6.5	10.384	9	13 9 28.46	2.0425	5 55 38.6	9.563
10	11 32 28.40	2.1010	1 59 43.4	10.386	10	13 11 31.00	2.0422	6 5 11.3	9.528
11	11 34 34.39	2.0987	1 49 20.2	10.387	11	13 13 33.52	2.0419	6 14 41.9	9.493
12	11 36 40.24	2.0964	1 38 57.0	10.387	12	13 15 36.03	2.0417	6 24 10.4	9.457
13	11 38 45.96	2.0943	1 28 33.8	10.386	13	13 17 38.53	2.0416	6 33 36.7	9.419
14	11 40 51.55	2.0922	1 18 10.7	10.384	14	13 19 41.02	2.0414	6 43 0.7	9.381
15	11 42 57.02	2.0901	1 7 47.8	10.381	15	13 21 43.50	2.0413	6 52 22.4	9.343
16	11 45 2.36	2.0881	0 57 25.0	10.377	16	13 23 45.98	2.0412	7 1 41.8	9.303
17	11 47 7.59	2.0862	0 47 2.5	10.372	17	13 25 48.45	2.0412	7 10 58.8	9.264
18	11 49 12.70	2.0843	0 36 40.3	10.367	18	13 27 50.92	2.0413	7 20 13.5	9.224
19	11 51 17.69	2.0823	0 26 18.4	10.361	19	13 29 53.39	2.0412	7 29 25.7	9.183
20	11 53 22.57	2.0804	0 15 56.9	10.354	20	13 31 55.86	2.0412	7 38 35.4	9.141
21	11 55 27.34	2.0786	N. 0 5 35.9	10.347	21	13 33 58.34	2.0413	7 47 42.6	9.099
22	11 57 32.00	2.0768	S. 0 4 44.7	10.338	22	13 36 0.82	2.0414	7 56 47.3	9.057
23	11 59 36.56	2.0750	0 15 4.7	10.328	23	13 38 3.31	2.0415	8 5 49.4	9.013
24	12 1 41.02	2.0735	S. 0 25 24.1	10.318	24	13 40 5.80	2.0416	S. 8 14 48.8	8.968

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 25.					WEDNESDAY 27.				
0	13 40 5.80	2.0416	S. 8 14' 48.8"	8.968	0	15 18 39.67	2.0709	S. 14 23' 15.3"	6.175
1	13 42 8.30	2.0418	8 23 45.6	8.984	1	15 20 43.91	2.0710	14 29 23.7	6.104
2	13 44 10.82	2.0421	8 32 39.7	8.878	2	15 22 48.19	2.0718	14 35 27.8	6.039
3	13 46 13.35	2.0423	8 41 31.0	8.832	3	15 24 52.52	2.0726	14 41 27.6	5.961
4	13 48 15.89	2.0425	8 50 19.5	8.785	4	15 26 56.90	2.0733	14 47 23.1	5.869
5	13 50 18.45	2.0428	8 59 5.2	8.738	5	15 29 1.32	2.0741	14 53 14.3	5.817
6	13 52 21.03	2.0432	9 7 48.1	8.691	6	15 31 5.79	2.0748	14 59 1.1	5.744
7	13 54 23.63	2.0435	9 16 28.1	8.642	7	15 33 10.30	2.0756	15 4 43.6	5.671
8	13 56 26.25	2.0438	9 25 5.2	8.593	8	15 35 14.86	2.0764	15 10 21.6	5.597
9	13 58 28.89	2.0442	9 33 39.3	8.543	9	15 37 19.47	2.0772	15 15 55.2	5.523
10	14 0 31.55	2.0446	9 42 10.4	8.493	10	15 39 24.12	2.0779	15 21 24.4	5.449
11	14 2 34.24	2.0450	9 50 38.5	8.442	11	15 41 28.82	2.0787	15 26 49.1	5.374
12	14 4 36.95	2.0454	9 59 3.5	8.391	12	15 43 33.56	2.0794	15 32 9.3	5.299
13	14 6 39.69	2.0459	10 7 25.4	8.339	13	15 45 38.35	2.0802	15 37 25.0	5.223
14	14 8 42.46	2.0464	10 15 44.2	8.287	14	15 47 43.18	2.0809	15 42 36.1	5.148
15	14 10 45.26	2.0469	10 23 59.8	8.233	15	15 49 48.05	2.0815	15 47 42.7	5.073
16	14 12 48.09	2.0474	10 32 12.2	8.179	16	15 51 52.96	2.0822	15 52 44.7	4.995
17	14 14 50.95	2.0480	10 40 21.3	8.124	17	15 53 57.91	2.0828	15 57 42.1	4.918
18	14 16 53.85	2.0486	10 48 27.1	8.069	18	15 56 2.90	2.0835	16 2 34.9	4.841
19	14 18 56.78	2.0491	10 56 29.6	8.014	19	15 58 7.93	2.0842	16 7 23.0	4.763
20	14 20 59.74	2.0497	11 4 28.8	7.958	20	16 0 13.00	2.0848	16 12 6.4	4.685
21	14 23 2.74	2.0503	11 12 24.6	7.903	21	16 2 18.11	2.0855	16 16 45.2	4.607
22	14 25 5.78	2.0509	11 20 17.0	7.844	22	16 4 23.26	2.0861	16 21 19.3	4.528
23	14 27 8.85	2.0515	S. 11 28 5.9	7.786	23	16 6 28.44	2.0867	S. 16 25 48.6	4.449
TUESDAY 26.					THURSDAY 28.				
0	14 29 11.96	2.0522	S. 11 35 51.3	7.727	0	16 8 33.66	2.0872	S. 16 30 13.2	4.370
1	14 31 15.11	2.0528	11 43 33.2	7.669	1	16 10 38.91	2.0878	16 34 33.0	4.290
2	14 33 18.30	2.0535	11 51 11.6	7.610	2	16 12 44.20	2.0884	16 38 48.0	4.211
3	14 35 21.53	2.0542	11 58 46.4	7.550	3	16 14 49.52	2.0889	16 42 58.3	4.132
4	14 37 24.80	2.0548	12 6 17.6	7.489	4	16 16 54.87	2.0894	16 47 3.8	4.051
5	14 39 28.11	2.0556	12 13 45.1	7.428	5	16 19 0.25	2.0900	16 51 4.4	3.970
6	14 41 31.47	2.0563	12 21 9.0	7.367	6	16 21 5.67	2.0905	16 55 0.2	3.889
7	14 43 34.87	2.0570	12 28 29.2	7.305	7	16 23 11.11	2.0909	16 58 51.1	3.808
8	14 45 38.31	2.0577	12 35 45.6	7.242	8	16 25 16.58	2.0914	17 2 37.1	3.727
9	14 47 41.80	2.0585	12 42 58.2	7.178	9	16 27 22.08	2.0919	17 6 18.3	3.646
10	14 49 45.33	2.0593	12 50 7.0	7.115	10	16 29 27.61	2.0923	17 9 54.6	3.563
11	14 51 48.91	2.0601	12 57 12.0	7.052	11	16 31 33.16	2.0927	17 13 25.9	3.481
12	14 53 52.54	2.0608	13 4 13.2	6.987	12	16 33 38.73	2.0931	17 16 52.3	3.399
13	14 55 56.21	2.0616	13 11 10.5	6.922	13	16 35 44.33	2.0935	17 20 13.8	3.316
14	14 57 59.93	2.0623	13 18 3.8	6.856	14	16 37 49.95	2.0938	17 23 30.3	3.233
15	15 0 3.69	2.0631	13 24 53.2	6.790	15	16 39 55.58	2.0940	17 26 41.8	3.150
16	15 2 7.50	2.0639	13 31 38.6	6.723	16	16 42 1.23	2.0943	17 29 48.3	3.067
17	15 4 11.36	2.0647	13 38 20.0	6.657	17	16 44 6.90	2.0946	17 32 49.8	2.984
18	15 6 15.26	2.0654	13 44 57.4	6.589	18	16 46 12.59	2.0949	17 35 46.4	2.901
19	15 8 19.21	2.0662	13 51 30.7	6.521	19	16 48 18.29	2.0952	17 38 37.9	2.817
20	15 10 23.21	2.0670	13 57 59.9	6.452	20	16 50 24.01	2.0954	17 41 24.4	2.733
21	15 12 27.25	2.0678	14 4 25.0	6.383	21	16 52 29.74	2.0956	17 44 5.9	2.650
22	15 14 31.34	2.0686	14 10 45.9	6.314	22	16 54 35.48	2.0957	17 46 42.3	2.565
23	15 16 35.48	2.0694	14 17 2.7	6.245	23	16 56 41.23	2.0959	17 49 13.7	2.481
24	15 18 39.67	2.0702	S. 14 23 15.3	6.175	24	16 58 46.99	2.0961	S. 17 51 40.0	2.397

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 29.					SUNDAY 31.				
0	16 58 46.99	2.0961	S. 17° 51' 40.0"	2.397	0	18 39 4.58	2.0738	S. 18° 8' 33.3"	1.677
1	17 0 52.76	2.0963	17 54 1.2	2.312	1	18 41 8.98	2.0738	18 6 50.2	1.760
2	17 2 58.53	2.0963	17 56 17.4	2.297	2	18 43 13.32	2.0717	18 5 2.1	1.842
3	17 5 4.30	2.0962	17 58 28.5	2.142	3	18 45 17.59	2.0707	18 3 9.1	1.924
4	17 7 10.07	2.0963	18 0 34.5	2.057	4	18 47 21.80	2.0697	18 1 11.2	2.006
5	17 9 15.85	2.0963	18 2 35.4	1.972	5	18 49 25.95	2.0686	17 59 8.4	2.089
6	17 11 21.63	2.0963	18 4 31.2	1.887	6	18 51 30.03	2.0675	17 57 0.6	2.171
7	17 13 27.40	2.0963	18 6 21.9	1.802	7	18 53 34.05	2.0664	17 54 47.9	2.252
8	17 15 33.17	2.0962	18 8 7.5	1.717	8	18 55 38.00	2.0652	17 52 30.4	2.333
9	17 17 38.94	2.0961	18 9 48.0	1.632	9	18 57 41.88	2.0641	17 50 8.1	2.412
10	17 19 44.70	2.0959	18 11 23.3	1.546	10	18 59 45.60	2.0630	17 47 40.9	2.493
11	17 21 50.45	2.0958	18 12 53.5	1.461	11	19 1 49.44	2.0619	17 45 8.9	2.574
12	17 23 56.20	2.0957	18 14 18.6	1.375	12	19 3 53.12	2.0607	17 42 32.0	2.655
13	17 26 1.94	2.0955	18 15 38.5	1.290	13	19 5 56.73	2.0595	17 39 50.3	2.734
14	17 28 7.66	2.0953	18 16 53.3	1.204	14	19 8 0.26	2.0583	17 37 3.9	2.813
15	17 30 13.36	2.0949	18 18 3.0	1.118	15	19 10 3.72	2.0571	17 34 12.7	2.892
16	17 32 19.05	2.0947	18 19 7.5	1.032	16	19 12 7.11	2.0559	17 31 16.8	2.973
17	17 34 24.73	2.0945	18 20 6.9	0.947	17	19 14 10.43	2.0547	17 28 16.1	3.051
18	17 36 30.39	2.0943	18 21 1.2	0.862	18	19 16 13.67	2.0534	17 25 10.7	3.129
19	17 38 36.03	2.0938	18 21 50.3	0.776	19	19 18 16.84	2.0522	17 22 0.6	3.207
20	17 40 41.65	2.0934	18 22 34.3	0.691	20	19 20 19.93	2.0509	17 18 45.8	3.285
21	17 42 47.24	2.0930	18 23 13.2	0.605	21	19 22 22.95	2.0496	17 15 26.4	3.362
22	17 44 52.81	2.0927	18 23 46.9	0.519	22	19 24 25.89	2.0483	17 12 2.3	3.440
23	17 46 58.36	2.0923	S. 18 24 15.5	0.433	23	19 26 28.75	2.0470	S. 17 8 33.6	3.518
SATURDAY 30.					MONDAY, JUNE 1.				
0	17 49 3.88	2.0917	S. 18 24 38.9	0.348	0	19 28 31.53	2.0457	S. 17 5 0.2	3.595
1	17 51 9.37	2.0919	18 24 57.2	0.262	PHASES OF THE MOON.				
2	17 53 14.83	2.0907	18 25 10.4	0.177					
3	17 55 20.26	2.0909	18 25 18.4	0.092					
4	17 57 25.65	2.0896	18 25 21.4	- 0.007					
5	17 59 31.01	2.0891	19 25 19.2	+ 0.079	<div>☾ Last Quarter . . . May 6 20 43.0</div> <div>● New Moon . . . . . 14 3 17.5</div> <div>☽ First Quarter . . . . . 20 17 45.1</div> <div>○ Full Moon . . . . . 28 8 30.9</div>				
6	18 1 36.34	2.0885	18 25 11.9	0.184					
7	18 3 41.63	2.0878	18 24 59.5	0.249					
8	18 5 46.88	2.0872	18 24 42.0	0.334					
9	18 7 52.09	2.0865	18 24 19.4	0.419	<div>☾ Apogee . . . . . May 3 22.4</div> <div>☾ Perigee . . . . . 15 22.0</div> <div>☾ Apogee . . . . . 31 12.0</div>				
10	18 9 57.26	2.0858	18 23 51.7	0.504					
11	18 12 2.39	2.0851	18 23 18.9	0.589					
12	18 14 7.47	2.0843	18 22 41.0	0.673					
13	18 16 12.51	2.0836	18 21 58.1	0.757					
14	18 18 17.50	2.0828	18 21 10.1	0.842					
15	18 20 22.45	2.0821	18 20 17.0	0.927					
16	18 22 27.35	2.0813	18 19 18.9	1.011					
17	18 24 32.19	2.0803	18 18 15.7	1.095					
18	18 26 36.98	2.0794	18 17 7.5	1.178					
19	18 28 41.72	2.0785	18 15 54.3	1.262					
20	18 30 46.40	2.0776	18 14 36.1	1.345					
21	18 32 51.03	2.0767	18 13 12.9	1.428					
22	18 34 55.60	2.0757	18 11 44.7	1.512					
23	18 37 0.12	2.0748	18 10 11.5	1.595					
24	18 39 4.58	2.0738	S. 18 8 33.3	1.677					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	JUPITER W.	100° 40' 30"	2985	102° 11' 1"	2993	103° 41' 22"	3001	105° 11' 34"	3009
	Regulus W.	98 28 32	2970	99 59 22	2977	101 30 3	2985	103 0 34	2993
	Spica W.	44 59 11	2979	46 29 50	2985	48 0 21	2992	49 30 44	2999
	α Aquilæ E.	56 6 20	3004	54 47 50	3036	53 20 55	3071	52 12 37	3708
	Fomalhaut E.	87 26 23	3349	86 3 8	3358	84 40 3	3367	83 17 9	3376
	α Pegasi E.	102 36 59	3196	101 10 45	3201	99 44 37	3207	98 18 36	3212
2	Spica W.	57 0 36	3030	58 30 12	3035	59 59 41	3040	61 29 4	3046
	α Aquilæ E.	45 56 37	2939	44 43 50	2967	43 31 58	4048	42 21 6	4115
	Fomalhaut E.	76 25 29	3430	75 3 46	3442	73 42 17	3454	72 21 1	3465
	α Pegasi E.	91 10 10	3241	89 44 49	3247	88 19 36	3253	86 54 30	3259
	SUN E.	143 2 35	3400	141 40 18	3405	140 18 7	3410	138 56 2	3415
3	Spica W.	68 54 31	3068	70 23 22	3070	71 52 8	3073	73 20 51	3076
	Antares W.	24 39 6	3383	26 1 42	3353	27 24 52	3329	28 48 30	3307
	Fomalhaut E.	65 38 16	3535	64 18 30	3551	62 59 2	3566	61 39 51	3584
	α Pegasi E.	79 50 45	3229	78 26 21	3225	77 2 4	3201	75 37 54	3207
	SUN E.	132 6 56	3437	130 45 21	3440	129 23 50	3443	128 2 22	3446
4	Spica W.	80 43 48	3082	82 12 19	3083	83 40 49	3083	85 9 19	3082
	Antares W.	35 51 51	3236	37 17 17	3225	38 42 56	3216	40 8 46	3208
	Fomalhaut E.	55 8 54	3683	53 51 49	3708	52 35 10	3733	51 18 58	3760
	α Pegasi E.	68 38 47	3337	67 15 18	3344	65 51 57	3350	64 28 43	3357
	SUN E.	121 15 39	3453	119 54 22	3454	118 33 6	3454	117 11 50	3453
5	Spica W.	92 32 9	3074	94 0 50	3071	95 29 35	3067	96 58 25	3064
	Antares W.	47 20 24	3168	48 47 11	3160	50 14 8	3153	51 41 14	3145
	Fomalhaut E.	45 5 52	3936	43 53 9	3981	42 41 11	4031	41 30 2	4086
	α Pegasi E.	57 34 31	3323	56 12 6	3401	54 49 51	3410	53 27 46	3420
	SUN E.	110 25 8	3443	109 3 40	3439	107 42 8	3435	106 20 31	3431
6	Spica W.	104 23 55	3037	105 53 22	3030	107 22 57	3023	108 52 41	3016
	Antares W.	58 59 7	3103	60 27 13	3095	61 55 29	3085	63 23 57	3076
	Fomalhaut E.	35 49 37	4473	34 45 21	4581	33 42 40	4705	32 41 45	4845
	α Pegasi E.	46 40 30	3485	45 19 49	3503	43 59 28	3522	42 39 28	3544
	SUN E.	99 31 4	3402	98 8 50	3394	96 46 27	3386	95 23 55	3379
7	Antares W.	70 49 18	3023	72 19 2	3011	73 49 1	3000	75 19 14	2998
	α Aquilæ W.	31 1 8	5170	31 55 52	4974	32 53 8	4798	33 52 46	4640
	SUN E.	88 28 41	3329	87 5 3	3318	85 41 12	3306	84 17 8	3294
8	Antares W.	82 54 14	2923	84 26 4	2909	85 58 12	2894	87 30 38	2880
	α Aquilæ W.	39 20 58	4058	40 31 41	3969	41 43 51	3889	42 57 22	3814
	SUN E.	77 13 4	3226	75 47 26	3212	74 21 31	3198	72 55 19	3183
9	Antares W.	95 17 36	2804	96 51 59	2788	98 26 43	2772	100 1 48	2758
	α Aquilæ W.	49 22 46	3509	50 43 0	3459	52 4 10	3419	53 26 13	3367
	SUN E.	65 39 34	3101	64 11 25	3083	62 42 55	3065	61 14 3	3048
10	Antares W.	108 2 32	2675	109 39 46	2658	111 17 22	2642	112 55 20	2626
	α Aquilæ W.	60 28 42	3170	61 55 27	3136	63 22 53	3103	64 50 59	3071
	SUN E.	53 44 17	2958	52 13 12	2940	50 41 44	2922	49 9 53	2903



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	JUPITER W.	108 41 36	3016	108 11 29	3023	109 41 13	3030	111 10 48	3036
	Regulus W.	104 30 56	3000	106 1 9	3006	107 31 14	3013	109 1 10	3020
	Spica W.	51 0 58	3005	52 31 4	3012	54 1 2	3018	55 30 53	3024
	α Aquilæ E.	50 55 58	3746	49 40 0	3788	48 24 45	3832	47 10 16	3881
	Fomalhaut E.	81 54 25	3386	80 31 53	3397	79 9 33	3408	77 47 25	3418
	α Pegasi E.	96 52 41	3218	95 26 53	3224	94 1 12	3230	92 35 38	3235
2	Spica W.	62 58 20	3050	64 27 31	3055	65 56 36	3059	67 25 36	3063
	α Aquilæ E.	41 11 19	4187	40 2 41	4266	38 55 17	4353	37 49 13	4448
	Fomalhaut E.	70 59 58	3479	69 39 10	3491	68 18 36	3506	66 58 18	3520
	α Pegasi E.	85 29 31	3265	84 4 39	3271	82 39 54	3277	81 15 16	3283
	Sun E.	137 34 2	3490	136 12 8	3494	134 50 19	3499	133 28 35	3433
3	Spica W.	74 49 31	3078	76 18 8	3079	77 46 43	3081	79 15 16	3089
	Antares W.	30 12 33	3289	31 36 57	3274	33 1 39	3259	34 26 38	3247
	Fomalhaut E.	60 20 59	3601	59 2 26	3621	57 44 14	3640	56 26 23	3661
	α Pegasi E.	74 13 51	3313	72 49 55	3319	71 26 6	3325	70 2 23	3331
	Sun E.	126 40 57	3447	125 19 34	3450	123 58 14	3452	122 36 56	3453
4	Spica W.	86 37 50	3082	88 6 22	3081	89 34 55	3078	91 3 31	3077
	Antares W.	41 34 46	3199	43 0 56	3191	44 27 16	3183	45 53 45	3175
	Fomalhaut E.	50 3 14	3790	48 48 1	3821	47 33 21	3856	46 19 17	3886
	α Pegasi E.	63 5 37	3364	61 42 39	3370	60 19 48	3377	58 57 5	3385
	Sun E.	115 50 33	3452	114 29 15	3450	113 7 55	3448	111 46 33	3446
5	Spica W.	98 27 19	3059	99 56 19	3055	101 25 24	3049	102 54 36	3043
	Antares W.	53 8 29	3137	54 35 54	3129	56 3 28	3121	57 31 12	3113
	Fomalhaut E.	40 19 47	4149	39 10 32	4216	38 2 21	4291	36 55 20	4376
	α Pegasi E.	52 5 52	3431	50 44 10	3443	49 22 42	3455	48 1 28	3470
	Sun E.	104 58 50	3487	103 37 4	3491	102 15 11	3415	100 53 11	3408
6	Spica W.	110 22 34	3008	111 52 37	2999	113 22 51	2991	114 53 15	2981
	Antares W.	64 52 36	3086	66 21 27	3056	67 50 31	3045	69 19 48	3034
	Fomalhaut E.	31 42 46	5005	30 45 55	5190	29 51 26	5402	28 59 33	5649
	α Pegasi E.	41 19 52	3569	40 0 44	3598	38 42 7	3630	37 24 5	3668
	Sun E.	94 1 14	3370	92 38 23	3360	91 15 21	3350	89 52 7	3339
7	Antares W.	76 49 42	2976	78 20 25	2962	79 51 25	2950	81 22 41	2936
	α Aquilæ W.	34 54 36	4499	35 58 29	4373	37 4 15	4258	38 11 47	4153
	Sun E.	82 52 50	3282	81 28 17	3269	80 3 29	3255	78 38 25	3241
8	Antares W.	89 3 23	2985	90 36 27	2950	92 9 50	2935	93 43 33	2919
	α Aquilæ W.	44 12 10	3745	45 28 10	3680	46 45 18	3620	48 3 31	3563
	Sun E.	71 28 49	3167	70 2 0	3150	68 34 51	3134	67 7 23	3117
9	Antares W.	101 37 14	2740	103 13 1	2723	104 49 10	2707	106 25 40	2691
	α Aquilæ W.	54 49 7	3324	56 12 51	3282	57 37 23	3244	59 2 40	3206
	Sun E.	59 44 50	3030	58 15 15	3013	56 45 18	2995	55 14 59	2977
10	Antares W.	114 33 39	2610	116 12 20	2594	117 51 23	2579	119 30 47	2564
	α Aquilæ W.	66 19 44	3040	67 49 7	3011	69 19 6	2992	70 49 41	2965
	Sun E.	47 37 38	2985	46 5 0	2967	44 31 59	2950	42 58 36	2932

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
11	$\alpha$ Aquilæ W.	72° 20' 50"	9229	73° 52' 32"	9204	75° 24' 46"	9280	76° 57' 31"	9256
	Fomalhaut W.	41 47 0	3494	43 8 49	3348	44 32 5	3278	45 56 42	3214
	Sun E.	41 24 50	9815	39 50 41	9797	38 16 9	9781	36 41 16	9764
12	$\alpha$ Aquilæ W.	84 48 26	9753	86 23 55	9736	87 59 47	9790	89 36 0	9705
	Fomalhaut W.	53 17 27	3261	54 48 41	3209	56 20 48	3270	57 53 45	3233
	Sun E.	28 41 39	9692	27 4 48	9681	25 27 42	9671	23 50 23	9662
16	Sun W.	26 22 23	9419	28 5 41	9408	29 49 4	9406	31 32 30	9405
	Jupiter E.	65 17 19	9107	63 26 30	9109	61 35 44	9111	59 45 2	9115
	Regulus E.	66 42 43	9080	64 51 13	9089	62 59 46	9085	61 8 24	9088
	Spica E.	120 13 38	9083	118 22 13	9085	116 30 50	9086	114 39 29	9088
17	Sun W.	40 9 22	9418	41 52 31	9423	43 35 33	9429	45 18 26	9436
	Jupiter E.	50 33 15	9143	48 43 21	9150	46 53 38	9158	45 4 7	9167
	Regulus E.	51 53 6	9113	50 2 27	9190	48 11 59	9198	46 21 42	9136
	Spica E.	105 24 5	9111	103 33 22	9116	101 42 48	9132	99 52 24	9130
18	Sun W.	53 50 20	9476	55 32 7	9485	57 13 41	9496	58 55 0	9506
	Saturn W.	27 47 29	9247	29 34 47	9251	31 21 59	9257	33 9 2	9264
	Jupiter E.	36 0 8	9290	34 12 11	9233	32 24 33	9247	30 37 15	9262
	Regulus E.	37 13 37	9184	35 24 46	9196	33 36 12	9208	31 47 57	9221
	Spica E.	90 43 19	9172	88 54 9	9188	87 5 13	9191	85 16 32	9202
19	Sun W.	67 17 49	9563	68 57 35	9575	70 37 4	9588	72 16 16	9601
	Saturn W.	42 1 25	9307	43 47 14	9318	45 32 47	9339	47 18 4	9340
	Spica E.	76 17 7	9257	74 30 4	9280	72 43 19	9281	70 56 51	9293
	Antares E.	121 41 57	9294	119 56 32	9333	118 11 20	9342	116 26 21	9352
20	Sun W.	80 27 52	9686	82 5 18	9679	83 42 26	9692	85 19 16	9707
	Saturn W.	56 0 26	9398	57 44 4	9410	59 27 25	9422	61 10 28	9434
	Pollux W.	30 7 5	9690	31 43 46	9678	33 20 55	9693	34 58 25	9651
	Spica E.	62 9 3	9356	60 24 25	9369	58 40 6	9369	56 56 5	9395
	Antares E.	107 45 10	9406	106 1 43	9417	104 18 32	9429	102 35 38	9440
21	Sun W.	93 18 53	9774	94 53 55	9787	96 28 40	9801	98 3 7	9815
	Saturn W.	69 41 23	9496	71 22 42	9508	73 3 44	9520	74 44 29	9533
	Pollux W.	43 8 35	9632	44 46 47	9634	46 24 56	9636	48 3 2	9640
	Spica E.	48 20 43	9462	46 38 36	9475	44 56 47	9488	43 15 17	9502
	Antares E.	94 5 20	9501	92 24 8	9513	90 43 13	9525	89 2 35	9538
22	Sun W.	105 51 1	9880	107 23 45	9894	108 56 12	9906	110 28 23	9919
	Saturn W.	83 3 57	9583	84 43 1	9605	86 21 49	9617	88 0 21	9628
	Pollux W.	56 11 57	9699	57 49 19	9675	59 26 32	9693	61 3 35	9691
	Jupiter W.	20 17 52	9658	21 55 28	9659	23 33 3	9691	25 10 35	9685
	Regulus W.	19 12 43	9607	20 51 29	9610	22 30 11	9614	24 8 47	9619
	Spica E.	34 52 34	9571	33 12 59	9585	31 33 44	9601	29 54 50	9616
	Antares E.	80 43 41	9599	79 4 45	9612	77 26 7	9625	75 47 46	9637
23	Sun W.	118 5 19	9981	119 35 55	9993	121 6 16	1005	122 36 22	1018
	Saturn W.	96 9 9	9685	97 46 9	9698	99 22 54	9707	100 59 25	9717
	Pollux W.	69 6 6	9753	70 42 2	9741	72 17 47	9750	73 53 20	9759
	Jupiter W.	33 16 29	9698	34 53 11	9706	36 29 43	9715	38 6 3	9723

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
11	$\alpha$ Aquilæ W.	78° 30' 47"	2833	80° 4' 32"	2812	81° 36' 44"	2792	83° 13' 22"	2778
	Fomalhaut W.	47 22 35	3153	48 49 40	3097	50 17 53	3045	51 47 10	2997
	Sun E.	35 6 1	2748	33 30 25	2733	31 54 29	2718	30 18 13	2704
12	$\alpha$ Aquilæ W.	91 12 33	2890	92 49 26	2877	94 26 37	2865	96 4 4	2854
	Fomalhaut W.	59 27 30	2798	61 2 0	2786	62 37 12	2736	64 13 4	2707
	Sun E.	22 12 52	2656	20 35 13	2654	18 57 31	2656	17 19 52	2664
16	Sun W.	33 15 57	2406	34 59 23	2406	36 42 47	2410	38 26 7	2414
	Jupiter E.	57 54 26	2119	56 3 56	2124	54 13 34	2130	52 23 20	2136
	Regulus E.	59 17 7	2092	57 25 56	2096	55 34 51	2101	53 43 54	2107
	Spica E.	112 48 12	2092	110 57 0	2096	109 5 55	2100	107 14 56	2105
17	Sun W.	47 1 10	2443	48 43 44	2450	50 26 8	2458	52 8 20	2467
	Jupiter E.	43 14 49	2176	41 25 45	2186	39 36 56	2196	37 48 23	2208
	Regulus E.	44 31 37	2144	42 41 45	2153	40 52 7	2163	39 2 44	2174
	Spica E.	98 2 11	2137	96 12 9	2145	94 22 19	2154	92 32 42	2163
18	Sun W.	60 36 5	2517	62 16 55	2526	63 57 29	2540	65 37 47	2551
	Saturn W.	34 55 55	2271	36 42 37	2280	38 29 6	2289	40 15 22	2298
	Jupiter E.	28 50 20	2279	27 3 49	2286	25 17 44	2315	23 32 7	2337
	Regulus E.	30 0 1	2225	28 12 25	2249	26 25 11	2266	24 38 21	2285
	Spica E.	83 28 7	2212	81 39 57	2223	79 52 4	2234	78 4 27	2245
19	Sun W.	73 55 10	2613	75 33 47	2626	77 12 6	2639	78 50 8	2652
	Saturn W.	49 3 5	2351	50 47 50	2362	52 32 19	2374	54 16 31	2386
	Spica E.	69 10 41	2305	67 24 49	2317	65 39 15	2331	63 54 0	2343
	Antares E.	114 41 37	2302	112 57 7	2372	111 12 52	2383	109 28 53	2394
20	Sun W.	86 55 47	2730	88 32 0	2734	90 7 55	2747	91 43 33	2760
	Saturn W.	62 53 14	2447	64 35 42	2459	66 17 53	2471	67 59 47	2484
	Pollux W.	36 36 11	2643	38 14 8	2637	39 52 13	2633	41 30 23	2639
	Spica E.	55 12 23	2408	53 29 0	2421	51 45 55	2434	50 3 9	2448
	Antares E.	100 53 0	2452	99 10 39	2464	97 28 35	2477	95 46 49	2469
21	Sun W.	99 37 16	2828	101 11 8	2841	102 44 43	2854	104 18 1	2868
	Saturn W.	76 24 56	2545	78 5 6	2557	79 45 0	2569	81 24 37	2582
	Pollux W.	49 41 3	2644	51 18 58	2649	52 56 46	2655	54 34 26	2662
	Spica E.	41 34 6	2515	39 53 14	2529	38 12 41	2543	36 32 28	2557
	Antares E.	87 22 14	2550	85 42 10	2562	84 2 23	2575	82 22 53	2588
22	Sun W.	112 0 18	2931	113 31 57	2944	115 3 20	2957	116 34 27	2969
	Saturn W.	89 38 38	2640	91 16 39	2652	92 54 24	2663	94 31 54	2674
	Pollux W.	62 40 27	2698	64 17 9	2707	65 53 40	2716	67 29 59	2725
	Jupiter W.	26 48 2	2669	28 25 23	2676	30 2 35	2684	31 39 37	2691
	Regulus W.	25 47 16	2626	27 25 36	2633	29 3 46	2641	30 41 45	2649
	Spica E.	28 16 17	2632	26 38 5	2648	25 0 15	2666	23 22 49	2684
	Antares E.	74 9 41	2649	72 31 53	2661	70 54 21	2674	69 17 6	2687
23	Sun W.	124 6 13	3030	125 35 49	3041	127 5 11	3052	128 34 19	3065
	Saturn W.	102 35 42	2728	104 11 45	2738	105 47 34	2749	107 23 9	2759
	Pollux W.	75 28 42	2768	77 3 52	2777	78 38 50	2786	80 13 36	2795
	Jupiter W.	39 42 12	2739	41 18 10	2741	42 53 56	2750	44 29 30	2758

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
23	Regulus W.	32° 19' 33"	2857	33° 57' 10"	2866	35° 34' 35"	2875	37° 11' 48"	2884
	Antares E.	67 40 8	2866	66 3 26	2711	64 27 1	2794	62 50 53	2736
	α Aquilæ E.	115 38 24	3153	114 11 18	3150	112 44 9	3148	111 16 58	3148
24	SUN W.	130 3 12	3076	131 31 51	3088	133 0 15	3100	134 28 25	3110
	SATURN W.	108 58 31	2769	110 33 40	2779	112 8 35	2789	113 43 17	2799
	Pollux W.	81 48 11	2804	83 22 34	2813	84 56 45	2822	86 30 44	2831
	JUPITER W.	46 4 53	2767	47 40 4	2775	49 15 4	2785	50 49 52	2793
	Regulus W.	45 14 55	2729	46 50 56	2738	48 26 46	2747	50 2 24	2755
	Antares E.	54 54 21	2800	53 19 53	2814	51 45 43	2827	50 11 50	2841
	α Aquilæ E.	104 1 20	3159	102 34 22	3163	101 7 28	3168	99 40 40	3173
25	Pollux W.	94 17 44	2876	95 50 33	2886	97 23 10	2895	98 55 35	2904
	JUPITER W.	58 41 5	2836	60 14 46	2844	61 48 17	2852	63 21 37	2860
	Regulus W.	57 57 43	2798	59 32 13	2806	61 6 33	2814	62 40 42	2823
	Antares E.	42 27 2	2816	40 55 4	2833	39 23 27	2851	37 52 13	2870
	α Aquilæ E.	92 28 30	2907	91 2 29	2916	89 36 39	2925	88 10 59	2934
26	Pollux W.	106 34 48	2950	108 6 3	2959	109 37 7	2969	111 7 59	2977
	JUPITER W.	71 5 43	2900	72 38 2	2908	74 10 11	2915	75 42 11	2923
	Regulus W.	70 28 50	2889	72 1 58	2899	73 34 56	2877	75 7 44	2884
	Spica W.	17 12 31	2863	18 43 43	2846	20 15 4	2841	21 46 31	2839
	α Aquilæ E.	81 5 31	2957	79 41 4	2999	78 16 51	3312	76 52 53	3325
27	JUPITER W.	83 19 47	2959	84 50 51	2966	86 21 46	2973	87 52 33	2980
	Regulus W.	82 49 25	2990	84 21 18	2927	85 53 3	2934	87 24 39	2940
	Spica W.	29 23 40	2950	30 54 56	2953	32 26 8	2958	33 57 14	2962
	α Aquilæ E.	69 57 4	3400	68 34 48	3417	67 12 51	3426	65 51 15	3455
	Fomalhaut E.	101 46 38	3309	100 22 37	3312	98 58 39	3315	97 34 45	3319
28	JUPITER W.	95 24 21	3013	96 54 18	3019	98 24 7	3025	99 53 49	3030
	Regulus W.	95 0 36	2973	96 31 23	2978	98 2 3	2985	99 32 35	2990
	Spica W.	41 31 20	2925	43 1 51	2990	44 32 16	2995	46 2 35	3001
	α Aquilæ E.	59 8 59	3568	57 49 50	3594	56 31 9	3623	55 12 59	3652
	Fomalhaut E.	90 36 31	3344	89 13 11	3351	87 49 58	3358	86 26 53	3364
	α Pegasi E.	105 55 18	3210	104 29 21	3214	103 3 28	3217	101 37 39	3220
29	JUPITER W.	107 20 31	3060	108 49 30	3065	110 18 23	3069	111 47 10	3075
	Regulus W.	107 3 31	3017	108 33 22	3023	110 3 6	3028	111 32 44	3033
	Spica W.	53 32 37	3093	55 2 21	3098	56 31 59	3033	58 1 31	3038
	α Aquilæ E.	48 50 54	3838	47 36 31	3883	46 22 54	3833	45 10 8	3866
	Fomalhaut E.	79 33 33	3404	78 11 21	3414	76 49 20	3424	75 27 31	3434
	α Pegasi E.	94 29 34	3229	93 4 11	3244	91 38 54	3248	90 13 42	3253
30	Spica W.	65 27 54	3056	66 56 57	3060	68 25 55	3063	69 54 50	3066
	Antares W.	21 27 29	3471	22 48 26	3485	24 10 14	3488	25 32 44	3488
	Fomalhaut E.	68 41 25	3492	67 20 52	3505	66 0 33	3519	64 40 30	3534
	α Pegasi E.	83 9 6	2978	81 44 29	2984	80 19 59	2989	78 55 35	2995
31	Spica W.	77 18 33	3078	78 47 9	3080	80 15 43	3082	81 44 15	3082
	Antares W.	32 32 32	3359	33 57 31	3347	35 22 44	3326	36 48 10	3327
	Fomalhaut E.	58 4 38	3622	56 46 27	3642	55 28 38	3654	54 11 13	3669
	α Pegasi E.	71 55 18	3325	70 31 36	3339	69 8 2	3339	67 44 36	3340

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	Regulus W.	38 48 50	2683	40 25 40	2709	42 2 17	2711	43 38 42	2730
	Antares E.	61 15 1	2749	59 39 26	2768	58 4 8	2774	56 29 6	2787
	α Aquilæ E.	109 49 47	3149	108 22 27	3150	106 55 28	3153	105 28 22	3156
24	SUN W.	135 56 22	3129	137 24 5	3133	138 51 34	3146	140 18 48	3158
	SATURN W.	115 17 46	2808	116 52 3	2818	118 26 7	2828	119 59 59	2838
	Pollux W.	88 4 31	2840	89 38 7	2849	91 11 31	2859	92 44 43	2868
	JUPITER W.	52 24 29	2801	53 58 55	2810	55 33 10	2819	57 7 13	2828
	Regulus W.	51 37 51	2764	53 13 6	2772	54 48 10	2782	56 23 2	2790
	Antares E.	48 38 15	2855	47 4 58	2869	45 32 0	2884	43 59 21	2900
	α Aquilæ E.	98 13 59	3179	96 47 25	3185	95 20 58	3193	93 54 40	3199
25	Pollux W.	100 27 49	2913	101 59 51	2922	103 31 42	2931	105 3 21	2941
	JUPITER W.	64 54 47	2899	66 27 46	2906	68 0 35	2914	69 33 14	2922
	Regulus W.	64 14 40	2831	65 48 28	2839	67 22 5	2847	68 55 32	2854
	Antares E.	36 21 23	2990	34 50 58	3013	33 21 1	3036	31 51 33	3062
	α Aquilæ E.	86 45 30	3243	85 20 12	3253	83 55 6	3264	82 30 12	3275
26	Pollux W.	112 38 38	2989	114 9 5	2998	115 39 20	3008	117 9 23	3018
	JUPITER W.	77 14 1	2931	78 45 41	2938	80 17 12	2945	81 48 34	2952
	Regulus W.	76 40 23	2899	78 12 52	2909	79 45 12	2916	81 17 23	2913
	Spica W.	23 18 0	2939	24 49 29	2941	26 20 56	2943	27 52 20	2946
	α Aquilæ E.	75 20 10	3338	74 5 43	3352	72 42 32	3368	71 19 39	3384
27	JUPITER W.	89 23 11	2986	90 53 41	2993	92 24 3	3000	93 54 16	3006
	Regulus W.	88 56 7	2946	90 27 27	2954	91 58 38	2960	93 29 41	2966
	Spica W.	35 28 15	2966	36 59 10	2971	38 29 59	2975	40 0 43	2981
	α Aquilæ E.	64 30 1	3475	63 9 9	3496	61 48 40	3518	60 28 36	3543
	Fomalhaut E.	96 10 55	3393	94 47 10	3396	93 23 31	3333	91 59 58	3338
28	JUPITER W.	101 23 24	3036	102 52 52	3043	104 22 12	3048	105 51 25	3054
	Regulus W.	101 3 0	2996	102 33 18	3001	104 3 29	3007	105 33 33	3012
	Spica W.	47 32 47	3005	49 2 53	3010	50 32 53	3014	52 2 48	3019
	α Aquilæ E.	53 55 21	3684	52 38 17	3719	51 21 50	3755	50 6 1	3796
	Fomalhaut E.	85 3 55	3371	83 41 6	3379	82 18 26	3387	80 55 55	3395
	α Pegasi E.	100 11 53	3223	98 46 11	3227	97 20 34	3231	95 55 2	3235
29	JUPITER W.	113 15 50	3080	114 44 24	3085	116 12 52	3089	117 41 15	3093
	Regulus W.	113 2 16	3038	114 31 42	3042	116 1 3	3046	117 30 19	3051
	Spica W.	59 30 57	3049	61 0 18	3045	62 29 35	3049	63 58 47	3053
	α Aquilæ E.	43 58 15	4045	42 47 20	4110	41 37 28	4180	40 28 43	4256
	Fomalhaut E.	74 5 53	3445	72 44 27	3455	71 23 13	3467	70 2 12	3479
	α Pegasi E.	88 48 35	3258	87 23 34	3263	85 58 39	3267	84 33 49	3273
30	Spica W.	71 23 41	3089	72 52 29	3072	74 21 13	3074	75 49 54	3078
	Antares W.	26 55 49	3331	28 19 25	3308	29 43 27	3290	31 7 50	3274
	Fomalhaut E.	63 20 44	3550	62 1 15	3565	60 42 3	3583	59 23 10	3602
	α Pegasi E.	77 31 18	3301	76 7 8	3306	74 43 4	3313	73 19 7	3319
31	Spica W.	83 12 46	3084	84 41 15	3085	86 9 43	3085	87 38 11	3085
	Antares W.	38 13 47	3218	39 39 35	3210	41 5 32	3204	42 31 37	3196
	Fomalhaut E.	52 54 14	3714	51 37 42	3741	50 21 38	3771	49 6 6	3803
	α Pegasi E.	66 21 18	3354	64 58 9	3361	63 35 8	3369	62 12 16	3378

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from		Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.		Added to Apparent Time.		
Mon.	1	<sup>h</sup> 4 <sup>m</sup> 38 <sup>s</sup> 6.05	10.234	N. 22° 7' 13"	+19.98	15' 48.29"	68.43	<sup>m</sup> 2 <sup>s</sup> 25.49	<sup>s</sup> 0.376	
Tues.	2	4 42 11.87	10.251	22 14 49.4	19.01	15 48.15	68.48	2 16.25	0.393	
Wed.	3	4 46 18.08	10.267	22 22 14.3	18.04	15 48.02	68.53	2 6.61	0.409	
Thur.	4	4 50 24.67	10.282	22 29 15.8	+17.06	15 47.89	68.58	1 56.61	0.424	
Frid.	5	4 54 31.62	10.297	22 35 53.8	16.08	15 47.77	68.63	1 46.25	0.439	
Sat.	6	4 58 38.92	10.311	22 42 8.1	15.09	15 47.65	68.68	1 35.54	0.453	
SUN.	7	5 2 46.54	10.324	22 47 58.5	+14.10	15 47.53	68.72	1 24.50	0.466	
Mon.	8	5 6 54.47	10.336	22 53 24.9	13.10	15 47.42	68.76	1 13.16	0.478	
Tues.	9	5 11 2.70	10.347	22 58 27.3	12.09	15 47.31	68.79	1 1.52	0.489	
Wed.	10	5 15 11.17	10.357	23 3 5.4	+11.08	15 47.21	68.82	0 49.64	0.499	
Thur.	11	5 19 19.86	10.366	23 7 19.3	10.06	15 47.11	68.85	0 37.54	0.508	
Frid.	12	5 23 28.77	10.374	23 11 8.7	9.04	15 47.02	68.88	0 25.23	0.516	
Sat.	13	5 27 37.86	10.381	23 14 33.7	+ 8.02	15 46.93	68.90	0 12.73	0.523	
SUN.	14	5 31 47.10	10.387	23 17 34.1	7.00	15 46.85	68.92	0 0.08	0.529	
Mon.	15	5 35 56.46	10.392	23 20 9.8	5.97	15 46.78	68.94	0 12.68	0.534	
Tues.	16	5 40 5.92	10.395	23 22 20.9	+ 4.95	15 46.71	68.95	0 25.54	0.537	
Wed.	17	5 44 15.45	10.398	23 24 7.3	3.92	15 46.64	68.96	0 38.49	0.540	
Thur.	18	5 48 25.03	10.399	23 25 28.9	2.89	15 46.58	68.97	0 51.49	0.541	
Frid.	19	5 52 34.64	10.400	23 26 25.7	+ 1.85	15 46.53	68.97	1 4.51	0.542	
Sat.	20	5 56 44.24	10.399	23 26 57.7	+ 0.82	15 46.48	68.97	1 17.51	0.541	
SUN.	21	6 0 53.81	10.397	23 27 4.9	- 0.21	15 46.43	68.97	1 30.48	0.539	
Mon.	22	6 5 3.32	10.394	23 26 47.3	- 1.24	15 46.39	68.97	1 43.40	0.536	
Tues.	23	6 9 12.76	10.391	23 26 4.9	2.28	15 46.35	68.96	1 56.25	0.533	
Wed.	24	6 13 22.12	10.387	23 24 57.7	3.31	15 46.32	68.95	2 9.01	0.529	
Thur.	25	6 17 31.36	10.382	23 23 25.7	- 4.34	15 46.29	68.93	2 21.66	0.524	
Frid.	26	6 21 40.46	10.376	23 21 29.1	5.37	15 46.27	68.91	2 34.17	0.518	
Sat.	27	6 25 49.41	10.369	23 19 7.9	6.40	15 46.25	68.89	2 46.52	0.511	
SUN.	28	6 29 58.18	10.362	23 16 22.1	- 7.42	15 46.22	68.87	2 58.70	0.503	
Mon.	29	6 34 6.76	10.353	23 13 11.7	8.44	15 46.20	68.84	3 10.70	0.495	
Tues.	30	6 38 15.14	10.344	23 9 36.9	9.45	15 46.19	68.81	3 22.49	0.486	
Wed.	31	6 42 23.29	10.334	N. 23 5 37.8	-10.46	15 46.18	68.77	3 34.05	0.476	

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sideral time.  
 The sign + prefixed to the hourly change of declination indicates that north declinations are increasing;  
 the sign - indicates that north declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Subtracted from Mean Time.		
Mon.	1	<sup>h</sup> 4 <sup>m</sup> 38 <sup>s</sup> 6.46	10.233	N. 22° 7' 2".1	+19.98	<sup>m</sup> 2 <sup>s</sup> 25.48	0.376	<sup>h</sup> 4 <sup>m</sup> 40 <sup>s</sup> 31.94
Tues.	2	4 42 12.26	10.250	22 14 50.1	19.01	2 16.24	0.393	4 44 28.50
Wed.	3	4 46 18.45	10.266	22 22 14.9	18.04	2 6.60	0.409	4 48 25.05
Thur.	4	4 50 25.01	10.281	22 29 16.4	+17.06	1 56.60	0.424	4 52 21.61
Frid.	5	4 54 31.93	10.296	22 35 54.3	16.08	1 46.24	0.439	4 56 18.17
Sat.	6	4 58 39.20	10.310	22 42 8.5	15.09	1 35.54	0.453	5 0 14.73
Sun.	7	5 2 46.79	10.323	22 47 58.8	+14.10	1 24.49	0.466	5 4 11.28
Mon.	8	5 6 54.69	10.335	22 53 25.2	13.10	1 13.15	0.478	5 8 7.84
Tues.	9	5 11 2.88	10.346	22 58 27.5	12.09	1 1.51	0.489	5 12 4.39
Wed.	10	5 15 11.32	10.356	23 3 5.6	+11.08	0 49.63	0.499	5 16 0.95
Thur.	11	5 19 19.98	10.365	23 7 19.4	10.06	0 37.53	0.508	5 19 57.51
Frid.	12	5 23 28.85	10.373	23 11 8.8	9.04	0 25.22	0.516	5 23 54.07
Sat.	13	5 27 37.90	10.380	23 14 33.7	+ 8.02	0 12.72	0.523	5 27 50.62
Sun.	14	5 31 47.10	10.386	23 17 34.1	7.00	0 0.08	0.529	5 31 47.18
Mon.	15	5 35 56.42	10.391	23 20 9.8	5.97	0 12.68	0.534	5 35 43.74
Tues.	16	5 40 5.84	10.394	23 22 20.9	+ 4.95	0 25.54	0.537	5 39 40.30
Wed.	17	5 44 15.34	10.397	23 24 7.3	3.92	0 38.49	0.540	5 43 36.85
Thur.	18	5 48 24.89	10.398	23 25 28.9	2.89	0 51.48	0.541	5 47 33.41
Frid.	19	5 52 34.46	10.399	23 26 25.7	+ 1.85	1 4.50	0.542	5 51 29.96
Sat.	20	5 56 44.02	10.398	23 26 57.7	+ 0.82	1 17.50	0.541	5 55 26.52
Sun.	21	6 0 53.55	10.396	23 27 4.9	- 0.21	1 30.47	0.539	5 59 23.08
Mon.	22	6 5 3.02	10.393	23 26 47.3	- 1.24	1 43.39	0.536	6 3 19.63
Tues.	23	6 9 12.43	10.390	23 26 4.9	2.28	1 56.24	0.533	6 7 16.19
Wed.	24	6 13 21.75	10.386	23 24 57.8	3.31	2 9.00	0.529	6 11 12.75
Thur.	25	6 17 30.95	10.381	23 23 25.9	- 4.34	2 21.64	0.524	6 15 9.31
Frid.	26	6 21 40.01	10.375	23 21 29.3	5.37	2 34.14	0.518	6 19 5.87
Sat.	27	6 25 48.92	10.368	23 19 8.1	6.40	2 46.50	0.511	6 23 2.42
Sun.	28	6 29 57.66	10.360	23 16 22.4	- 7.42	2 58.68	0.503	6 26 58.98
Mon.	29	6 34 6.21	10.352	23 13 12.1	8.44	3 10.68	0.495	6 30 55.53
Tues.	30	6 38 14.55	10.343	23 9 37.4	9.45	3 22.46	0.486	6 34 52.09
Wed.	31	6 42 22.67	10.333	N. 23 5 38.4	-10.46	3 34.02	0.476	6 38 48.65

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+ 9".8565.  
(Table III.)

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
 The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

Diff. for 1 Hour,  
 + 9°.8565.  
 (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	152	71° 5' 55.8	5' 35.4	143.59	+ 0.79	0.0062323	+ 26.3	19 16 18.10
2	153	72 3 21.7	3 1.1	143.56	0.73	0.0062948	25.7	19 12 22.19
3	154	73 0 46.9	0 26.1	143.54	0.65	0.0063558	25.1	19 8 26.28
4	155	73 58 11.5	57 50.5	143.51	+ 0.55	0.0064153	+ 24.4	19 4 30.37
5	156	74 55 35.4	55 14.3	143.49	0.43	0.0064731	23.7	19 0 34.46
6	157	75 52 58.8	52 37.6	143.46	0.30	0.0065290	22.9	18 56 38.55
7	158	76 50 21.6	50 0.2	143.44	+ 0.17	0.0065828	+ 22.0	18 52 42.64
8	159	77 47 43.9	47 22.3	143.42	+ 0.04	0.0066344	21.1	18 48 46.73
9	160	78 45 5.6	44 43.8	143.40	- 0.06	0.0066838	20.1	18 44 50.81
10	161	79 42 26.8	42 4.9	143.37	- 0.15	0.0067309	+ 19.1	18 40 54.89
11	162	80 39 47.4	39 25.4	143.35	0.21	0.0067755	18.0	18 36 58.99
12	163	81 37 7.4	36 45.2	143.32	0.26	0.0068175	17.0	18 33 3.09
13	164	82 34 26.8	34 4.4	143.29	- 0.28	0.0068569	+ 15.9	18 29 7.17
14	165	83 31 45.5	31 22.9	143.26	0.25	0.0068938	14.9	18 25 11.26
15	166	84 29 3.5	28 40.8	143.24	0.21	0.0069282	13.8	18 21 15.35
16	167	85 26 20.9	25 58.1	143.21	- 0.13	0.0069601	+ 12.8	18 17 19.44
17	168	86 23 37.6	23 14.6	143.18	- 0.04	0.0069895	11.8	18 13 23.52
18	169	87 20 53.5	20 30.3	143.15	+ 0.08	0.0070167	10.8	18 9 27.61
19	170	88 18 8.7	17 45.3	143.12	+ 0.21	0.0070417	+ 9.9	18 5 31.70
20	171	89 15 23.2	14 59.7	143.09	0.35	0.0070645	9.0	18 1 35.80
21	172	90 12 37.0	12 13.3	143.06	0.48	0.0070853	8.2	17 57 39.68
22	173	91 9 50.1	9 26.3	143.03	+ 0.61	0.0071042	+ 7.5	17 53 43.97
23	174	92 7 2.7	6 38.7	143.01	0.71	0.0071215	6.8	17 49 48.06
24	175	93 4 14.8	3 50.6	142.99	0.81	0.0071372	6.2	17 45 52.15
25	176	94 1 26.5	1 2.2	142.98	+ 0.87	0.0071514	+ 5.6	17 41 56.23
26	177	94 58 37.9	58 13.5	142.97	0.89	0.0071641	5.0	17 38 0.32
27	178	95 55 49.0	55 24.4	142.96	0.89	0.0071754	4.5	17 34 4.41
28	179	96 52 59.8	52 35.1	142.95	+ 0.85	0.0071852	+ 3.9	17 30 8.51
29	180	97 50 10.7	49 45.7	142.95	0.80	0.0071935	3.2	17 26 12.59
30	181	98 47 21.5	46 56.4	142.95	0.71	0.0072003	2.6	17 22 16.68
31	182	99 44 32.5	44 7.3	142.96	+ 0.61	0.0072056	+ 1.9	17 18 20.77
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>th</sup> .								
Diff. for 1 Hour, — 9 <sup>m</sup> .8296. (Table II.)								



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	
1	14' 45.3	14' 46.1	54' 2.2	+ 0.15	54' 4.9	+ 0.31	<sup>h</sup> 15 <sup>m</sup> 16.6	<sup>m</sup> 1.92	<sup>d</sup> 17.9
2	14 47.4	14 49.2	54 9.7	0.49	54 16.6	0.67	16 2.3	1.89	18.9
3	14 51.7	14 54.8	54 25.7	0.85	54 37.0	1.04	16 47.3	1.87	19.9
4	14 58.5	15 2.9	54 50.6	+ 1.23	55 6.6	+ 1.43	17 32.1	1.86	20.9
5	15 7.8	15 13.4	55 24.9	1.62	55 45.3	1.79	18 17.1	1.89	21.9
6	15 19.5	15 26.2	56 7.9	1.96	56 32.4	2.12	19 3.2	1.95	22.9
7	15 33.3	15 40.8	56 58.5	+ 2.22	57 25.9	+ 2.33	19 51.1	2.05	23.9
8	15 48.5	15 56.2	57 54.1	2.37	58 22.7	2.37	20 41.6	2.17	24.9
9	16 4.0	16 11.5	58 51.1	2.33	59 18.7	2.23	21 35.4	2.32	25.9
10	16 18.6	16 25.1	59 44.8	+ 2.08	60 8.6	+ 1.87	22 32.7	2.47	26.9
11	16 30.8	16 35.5	60 29.6	1.60	60 47.0	1.28	23 33.3	2.58	27.9
12	16 39.2	16 41.6	61 0.3	0.92	61 9.2	+ 0.54	δ		28.9
13	16 42.7	16 42.5	61 13.3	+ 0.14	61 12.6	- 0.26	0 35.7	2.61	0.6
14	16 41.0	16 38.3	61 7.1	- 0.64	60 57.2	0.99	1 38.1	2.57	1.6
15	16 34.5	16 29.8	60 43.3	1.30	60 25.8	1.57	2 38.7	2.46	2.6
16	16 24.2	16 18.0	60 5.4	- 1.79	59 42.7	- 1.96	3 36.2	2.32	3.6
17	16 11.4	16 4.5	59 18.4	2.07	58 53.0	2.13	4 30.4	2.19	4.6
18	15 57.5	15 50.4	58 27.2	2.15	58 1.4	2.12	5 21.6	2.08	5.6
19	15 43.6	15 36.9	57 36.1	- 2.07	57 11.7	- 2.00	6 10.4	2.00	6.6
20	15 30.6	15 24.6	56 48.4	1.90	56 26.4	1.77	6 57.7	1.95	7.6
21	15 19.0	15 13.8	56 5.8	1.65	55 46.7	1.52	7 44.2	1.93	8.6
22	15 9.0	15 4.7	55 29.3	- 1.38	55 13.5	- 1.25	8 30.6	1.94	9.6
23	15 0.9	14 57.4	54 59.3	1.12	54 46.7	0.99	9 17.2	1.95	10.6
24	14 54.4	14 51.8	54 35.6	0.87	54 26.0	0.74	10 4.3	1.97	11.6
25	14 49.6	14 47.7	54 17.9	- 0.62	54 11.1	- 0.50	10 51.8	1.98	12.6
26	14 46.3	14 45.2	54 5.7	0.40	54 1.6	0.29	11 39.5	1.98	13.6
27	14 44.4	14 44.0	53 58.8	- 0.17	53 57.4	- 0.06	12 27.0	1.97	14.6
28	14 44.0	14 44.4	53 57.4	+ 0.05	53 58.7	+ 0.17	13 13.9	1.94	15.6
29	14 45.1	14 46.3	54 1.5	0.29	54 5.8	0.42	13 59.9	1.90	16.6
30	14 47.9	14 49.9	54 11.7	0.56	54 19.2	0.70	14 45.2	1.87	17.6
31	14 52.5	14 55.5	54 28.5	+ 0.85	54 39.7	+ 1.01	15 29.8	1.85	18.6

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 1.					WEDNESDAY 3.				
0	19 28 31.53	2.0457	S. 17° 5' 0.2"	3.595	0	21 5 14.59	1.9872	S. 12° 50' 28.9"	6.988
1	19 30 34.23	2.0444	17 1 22.2	3.671	1	21 7 13.80	1.9863	12 43 35.0	6.927
2	19 32 36.86	2.0431	16 57 39.7	3.747	2	21 9 12.95	1.9854	12 36 37.6	6.985
3	19 34 39.41	2.0418	16 53 52.6	3.823	3	21 11 12.05	1.9846	12 29 36.8	7.042
4	19 36 41.88	2.0405	16 50 1.0	3.898	4	21 13 11.10	1.9838	12 22 32.5	7.100
5	19 38 44.27	2.0393	16 46 4.9	3.974	5	21 15 10.10	1.9830	12 15 24.8	7.158
6	19 40 46.59	2.0380	16 42 4.2	4.049	6	21 17 9.06	1.9822	12 8 13.6	7.215
7	19 42 48.83	2.0368	16 37 59.0	4.123	7	21 19 7.97	1.9814	12 0 59.0	7.271
8	19 44 50.98	2.0359	16 33 49.4	4.197	8	21 21 6.83	1.9807	11 53 41.1	7.326
9	19 46 53.05	2.0338	16 29 35.4	4.271	9	21 23 5.65	1.9800	11 46 19.9	7.381
10	19 48 55.04	2.0325	16 25 16.9	4.345	10	21 25 4.43	1.9793	11 38 55.4	7.436
11	19 50 56.95	2.0313	16 20 54.0	4.418	11	21 27 3.17	1.9787	11 31 27.6	7.491
12	19 52 58.79	2.0300	16 16 26.7	4.491	12	21 29 1.87	1.9781	11 23 56.5	7.545
13	19 55 0.55	2.0288	16 11 55.1	4.563	13	21 31 0.54	1.9775	11 16 22.2	7.598
14	19 57 2.22	2.0279	16 7 19.1	4.636	14	21 32 59.17	1.9768	11 8 44.7	7.652
15	19 59 3.81	2.0269	16 2 38.8	4.708	15	21 34 57.76	1.9762	11 1 4.0	7.704
16	20 1 5.32	2.0246	15 57 54.2	4.779	16	21 36 56.32	1.9757	10 53 20.2	7.756
17	20 3 6.76	2.0233	15 53 5.3	4.851	17	21 38 54.85	1.9753	10 45 33.3	7.808
18	20 5 8.12	2.0220	15 48 12.1	4.922	18	21 40 53.36	1.9749	10 37 43.2	7.860
19	20 7 9.40	2.0207	15 43 14.7	4.992	19	21 42 51.84	1.9745	10 29 50.1	7.910
20	20 9 10.60	2.0193	15 38 13.1	5.062	20	21 44 50.30	1.9741	10 21 54.0	7.961
21	20 11 11.72	2.0180	15 33 7.3	5.131	21	21 46 48.73	1.9737	10 13 54.8	8.011
22	20 13 12.76	2.0167	15 27 57.4	5.200	22	21 48 47.14	1.9734	10 5 52.7	8.060
23	20 15 13.73	2.0155	S. 15 22 43.3	5.270	23	21 50 45.54	1.9732	S. 9 57 47.6	8.110
TUESDAY 2.					THURSDAY 4.				
0	20 17 14.62	2.0142	S. 15 17 25.0	5.339	0	21 52 43.92	1.9729	S. 9 49 39.5	8.159
1	20 19 15.43	2.0129	15 12 2.6	5.407	1	21 54 42.29	1.9727	9 41 28.5	8.207
2	20 21 16.17	2.0116	15 6 36.2	5.474	2	21 56 40.65	1.9725	9 33 14.7	8.254
3	20 23 16.83	2.0103	15 1 5.7	5.542	3	21 58 38.99	1.9723	9 24 58.0	8.301
4	20 25 17.41	2.0091	14 55 31.2	5.609	4	22 0 37.33	1.9722	9 16 38.5	8.348
5	20 27 17.92	2.0079	14 49 52.7	5.676	5	22 2 35.66	1.9722	9 8 16.2	8.395
6	20 29 18.36	2.0067	14 44 10.1	5.742	6	22 4 33.99	1.9722	8 59 51.1	8.441
7	20 31 18.73	2.0055	14 38 23.6	5.808	7	22 6 32.32	1.9722	8 51 23.3	8.486
8	20 33 19.02	2.0043	14 32 33.2	5.874	8	22 8 30.65	1.9722	8 42 52.8	8.531
9	20 35 19.24	2.0031	14 26 38.8	5.939	9	22 10 28.98	1.9723	8 34 19.6	8.576
10	20 37 19.39	2.0019	14 20 40.5	6.003	10	22 12 27.32	1.9724	8 25 43.7	8.620
11	20 39 19.47	2.0007	14 14 38.4	6.067	11	22 14 25.67	1.9725	8 17 5.2	8.663
12	20 41 19.48	1.9996	14 8 32.4	6.132	12	22 16 24.02	1.9727	8 8 24.1	8.706
13	20 43 19.42	1.9985	14 2 22.5	6.196	13	22 18 22.39	1.9730	7 59 40.4	8.749
14	20 45 19.30	1.9974	13 56 8.9	6.259	14	22 20 20.78	1.9732	7 50 54.2	8.791
15	20 47 19.11	1.9963	13 49 51.5	6.321	15	22 22 19.18	1.9735	7 42 5.5	8.832
16	20 49 18.85	1.9952	13 43 30.4	6.384	16	22 24 17.60	1.9739	7 33 14.3	8.874
17	20 51 18.53	1.9942	13 37 5.5	6.446	17	22 26 16.05	1.9743	7 24 20.6	8.915
18	20 53 18.15	1.9931	13 30 36.9	6.507	18	22 28 14.52	1.9747	7 15 24.5	8.955
19	20 55 17.70	1.9920	13 24 4.6	6.568	19	22 30 13.02	1.9752	7 6 26.0	8.995
20	20 57 17.19	1.9911	13 17 28.7	6.629	20	22 32 11.55	1.9757	6 57 25.1	9.034
21	20 59 16.63	1.9902	13 10 49.1	6.690	21	22 34 10.11	1.9763	6 48 21.9	9.073
22	21 1 16.01	1.9892	13 4 5.9	6.749	22	22 36 8.71	1.9769	6 39 16.4	9.111
23	21 3 15.33	1.9882	12 57 19.2	6.808	23	22 38 7.34	1.9775	6 30 8.6	9.148
24	21 5 14.59	1.9872	S. 12 50 28.9	6.866	24	22 40 6.01	1.9782	S. 6 20 58.6	9.185

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 5.					SUNDAY 7.				
0	22 <sup>h</sup> 40 <sup>m</sup> 6.01	1.9789	S. 6° 20' 58.6"	9.185	0	0 <sup>h</sup> 16 <sup>m</sup> 45.48	2.0085	N. 1° 31' 59.3"	10.980
1	22 42 4.73	1.9790	6 11 46.4	9.999	1	0 18 49.68	2.0717	1 42 16.3	10.986
2	22 44 3.49	1.9798	6 2 32.0	9.958	2	0 20 54.08	2.0749	1 52 33.6	10.992
3	22 46 2.30	1.9806	5 53 15.4	9.994	3	0 22 58.67	2.0789	2 2 51.3	10.996
4	22 48 1.16	1.9814	5 43 56.7	9.999	4	0 25 3.46	2.0815	2 13 9.2	10.999
5	22 50 0.07	1.9833	5 34 35.9	9.963	5	0 27 8.45	2.0848	2 23 27.2	10.308
6	22 51 59.04	1.9833	5 25 13.1	9.997	6	0 29 13.64	2.0889	2 33 45.4	10.304
7	22 53 58.07	1.9943	5 15 48.2	9.431	7	0 31 19.04	2.0917	2 44 3.7	10.305
8	22 55 57.16	1.9854	5 6 21.4	9.464	8	0 33 24.65	2.0953	2 54 22.0	10.306
9	22 57 56.32	1.9885	4 56 52.6	9.496	9	0 35 30.48	2.0989	3 4 40.4	10.306
10	22 59 55.54	1.9876	4 47 21.9	9.537	10	0 37 36.52	2.1094	3 14 58.7	10.304
11	23 1 54.83	1.9888	4 37 49.3	9.559	11	0 39 42.77	2.1080	3 25 16.9	10.302
12	23 3 54.20	1.9901	4 28 14.8	9.590	12	0 41 49.24	2.1068	3 35 34.9	10.999
13	23 5 53.64	1.9914	4 18 38.5	9.690	13	0 43 55.94	2.1136	3 45 52.7	10.995
14	23 7 53.16	1.9938	4 9 0.4	9.650	14	0 46 2.87	2.1174	3 56 10.3	10.990
15	23 9 52.77	1.9940	3 59 20.5	9.679	15	0 48 10.03	2.1913	4 6 27.5	10.984
16	23 11 52.46	1.9956	3 49 38.9	9.707	16	0 50 17.43	2.1953	4 16 44.3	10.977
17	23 13 52.24	1.9970	3 39 55.6	9.735	17	0 52 25.07	2.1993	4 27 0.7	10.969
18	23 15 52.10	1.9985	3 30 10.7	9.769	18	0 54 32.95	2.1333	4 37 16.6	10.960
19	23 17 52.06	2.0001	3 20 24.1	9.789	19	0 56 41.07	2.1374	4 47 31.9	10.951
20	23 19 52.12	2.0018	3 10 36.0	9.815	20	0 58 49.44	2.1415	4 57 46.7	10.941
21	23 21 52.28	2.0035	3 0 46.3	9.841	21	1 0 58.05	2.1457	5 8 0.8	10.939
22	23 23 52.54	2.0052	2 50 55.1	9.865	22	1 3 6.92	2.1499	5 18 14.2	10.917
23	23 25 52.91	2.0070	S. 2 41 2.5	9.889	23	1 5 16.04	2.1549	N. 5 28 26.8	10.903
SATURDAY 6.					MONDAY 8.				
0	23 27 53.38	2.0088	S. 2 31 8.4	9.913	0	1 7 25.42	2.1585	N. 5 38 38.6	10.188
1	23 29 53.97	2.0107	2 21 12.9	9.937	1	1 9 35.06	2.1689	5 48 49.4	10.173
2	23 31 54.67	2.0127	2 11 16.0	9.959	2	1 11 44.97	2.1674	5 58 59.3	10.157
3	23 33 55.49	2.0147	2 1 17.8	9.981	3	1 13 55.15	2.1718	6 9 8.2	10.139
4	23 35 56.43	2.0167	1 51 18.3	10.002	4	1 16 5.59	2.1763	6 19 16.0	10.190
5	23 37 57.50	2.0188	1 41 17.6	10.023	5	1 18 16.31	2.1809	6 29 22.6	10.100
6	23 39 58.69	2.0209	1 31 15.7	10.042	6	1 20 27.30	2.1855	6 39 28.0	10.080
7	23 42 0.01	2.0239	1 21 12.6	10.061	7	1 22 38.57	2.1902	6 49 32.2	10.058
8	23 44 1.47	2.0254	1 11 8.4	10.079	8	1 24 50.12	2.1948	6 59 35.0	10.035
9	23 46 3.06	2.0277	1 1 3.1	10.097	9	1 27 1.95	2.1996	7 9 36.4	10.011
10	23 48 4.79	2.0301	0 50 56.7	10.115	10	1 29 14.07	2.2044	7 19 36.3	9.986
11	23 50 6.67	2.0325	0 40 49.3	10.132	11	1 31 26.48	2.2092	7 29 34.7	9.959
12	23 52 8.69	2.0349	0 30 40.9	10.147	12	1 33 39.17	2.2140	7 39 31.4	9.932
13	23 54 10.86	2.0374	0 20 31.6	10.162	13	1 35 52.16	2.2189	7 49 26.5	9.904
14	23 56 13.18	2.0400	0 10 21.4	10.177	14	1 38 5.45	2.2239	7 59 19.9	9.874
15	23 58 15.66	2.0427	S. 0 0 10.4	10.190	15	1 40 19.03	2.2289	8 9 11.4	9.843
16	0 0 18.30	2.0453	N. 0 10 1.4	10.202	16	1 42 32.91	2.2339	8 19 1.0	9.811
17	0 2 21.10	2.0480	0 20 13.9	10.215	17	1 44 47.10	2.2390	8 28 48.7	9.778
18	0 4 24.06	2.0508	0 30 27.2	10.227	18	1 47 1.59	2.2441	8 38 34.4	9.744
19	0 6 27.19	2.0536	0 40 41.2	10.237	19	1 49 16.39	2.2492	8 48 18.0	9.708
20	0 8 30.49	2.0565	0 50 55.7	10.247	20	1 51 31.50	2.2544	8 57 59.4	9.673
21	0 10 33.97	2.0594	1 1 10.8	10.257	21	1 53 46.92	2.2596	9 7 38.6	9.634
22	0 12 37.62	2.0624	1 11 26.5	10.266	22	1 56 2.65	2.2648	9 17 15.5	9.595
23	0 14 41.46	2.0655	1 21 42.7	10.273	23	1 58 18.69	2.2700	9 26 50.0	9.554
24	0 16 45.48	2.0685	N. 1 31 59.3	10.280	24	2 0 35.05	2.2753	N. 9 36 22.0	9.519

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 9.					THURSDAY 11.				
0	2 0 35.05	2.2753	N. 9 36' 22.0"	9.512	0	3 56 8.65	2.5306	N. 16 0' 15.5"	5.968
1	2 2 51.73	2.2807	9 45 51.5	9.470	1	3 58 40.99	2.5414	16 6 10.4	5.892
2	2 5 8.73	2.2860	9 55 18.4	9.427	2	4 1 13.63	2.5469	16 11 58.9	5.753
3	2 7 26.05	2.2913	10 4 42.7	9.382	3	4 3 46.54	2.5510	16 17 40.8	5.644
4	2 9 43.69	2.2967	10 14 4.2	9.334	4	4 6 19.74	2.5556	16 23 16.2	5.535
5	2 12 1.66	2.3022	10 23 22.8	9.286	5	4 8 53.21	2.5602	16 28 45.0	5.424
6	2 14 19.96	2.3077	10 32 38.5	9.237	6	4 11 26.96	2.5647	16 34 7.1	5.312
7	2 16 38.58	2.3131	10 41 51.2	9.187	7	4 14 0.98	2.5692	16 39 22.4	5.198
8	2 18 57.53	2.3186	10 51 0.9	9.135	8	4 16 35.26	2.5735	16 44 30.9	5.084
9	2 21 16.82	2.3242	11 0 7.4	9.082	9	4 19 9.80	2.5778	16 49 32.5	4.968
10	2 23 36.44	2.3297	11 9 10.7	9.027	10	4 21 44.60	2.5821	16 54 27.1	4.852
11	2 25 56.39	2.3352	11 18 10.7	8.972	11	4 24 19.66	2.5864	16 59 14.7	4.734
12	2 28 16.67	2.3408	11 27 7.4	8.916	12	4 26 54.97	2.5905	17 3 55.2	4.615
13	2 30 37.29	2.3464	11 36 0.6	8.857	13	4 29 30.52	2.5944	17 8 28.5	4.495
14	2 32 58.24	2.3520	11 44 50.3	8.797	14	4 32 6.30	2.5982	17 12 54.6	4.374
15	2 35 19.53	2.3576	11 53 36.3	8.736	15	4 34 42.31	2.6021	17 17 13.4	4.252
16	2 37 41.15	2.3632	12 2 18.6	8.674	16	4 37 18.55	2.6059	17 21 24.8	4.129
17	2 40 3.11	2.3688	12 10 57.2	8.611	17	4 39 55.02	2.6096	17 25 28.9	4.006
18	2 42 25.41	2.3745	12 19 31.9	8.546	18	4 42 31.70	2.6131	17 29 25.5	3.881
19	2 44 48.05	2.3801	12 28 2.7	8.480	19	4 45 8.59	2.6166	17 33 14.6	3.755
20	2 47 11.02	2.3857	12 36 29.5	8.412	20	4 47 45.69	2.6199	17 36 56.1	3.628
21	2 49 34.33	2.3913	12 44 52.1	8.342	21	4 50 22.98	2.6231	17 40 30.0	3.501
22	2 51 57.98	2.3969	12 53 10.5	8.272	22	4 53 0.46	2.6263	17 43 56.2	3.372
23	2 54 21.96	2.4025	N. 13 1 24.7	8.201	23	4 55 38.13	2.6294	N. 17 47 14.7	3.244
WEDNESDAY 10.					FRIDAY 12.				
0	2 56 46.28	2.4082	N. 13 9 34.6	8.126	0	4 58 15.99	2.6334	N. 17 50 25.5	3.115
1	2 59 10.94	2.4138	13 17 40.1	8.063	1	5 0 54.02	2.6359	17 53 28.5	2.991
2	3 1 35.94	2.4194	13 25 41.0	7.977	2	5 3 32.22	2.6379	17 56 23.6	2.862
3	3 4 1.27	2.4250	13 33 37.3	7.890	3	5 6 10.57	2.6405	17 59 10.7	2.719
4	3 6 26.94	2.4306	13 41 28.9	7.801	4	5 8 49.08	2.6431	18 1 49.9	2.586
5	3 8 52.94	2.4361	13 49 15.8	7.749	5	5 11 27.74	2.6456	18 4 21.1	2.453
6	3 11 19.27	2.4417	13 56 57.9	7.680	6	5 14 6.55	2.6479	18 6 44.3	2.320
7	3 13 45.94	2.4473	14 4 35.0	7.577	7	5 16 45.49	2.6501	18 8 59.5	2.186
8	3 16 12.94	2.4527	14 12 7.1	7.493	8	5 19 24.56	2.6521	18 11 6.6	2.051
9	3 18 40.27	2.4582	14 19 34.2	7.408	9	5 22 3.74	2.6540	18 13 5.6	1.915
10	3 21 7.93	2.4637	14 26 56.1	7.323	10	5 24 43.04	2.6559	18 14 56.4	1.778
11	3 23 35.92	2.4692	14 34 12.8	7.233	11	5 27 22.45	2.6577	18 16 39.0	1.642
12	3 26 4.23	2.4746	14 41 24.1	7.143	12	5 30 1.96	2.6593	18 18 13.5	1.506
13	3 28 32.87	2.4800	14 48 30.0	7.052	13	5 32 41.56	2.6608	18 19 39.7	1.369
14	3 31 1.83	2.4853	14 55 30.4	6.961	14	5 35 21.25	2.6622	18 20 57.7	1.231
15	3 33 31.11	2.4906	15 2 25.3	6.867	15	5 38 1.02	2.6634	18 22 7.4	1.092
16	3 36 0.71	2.4959	15 9 14.5	6.772	16	5 40 40.86	2.6645	18 23 8.8	0.954
17	3 38 30.62	2.5012	15 15 58.0	6.677	17	5 43 20.76	2.6655	18 24 1.9	0.816
18	3 41 0.85	2.5064	15 22 35.7	6.579	18	5 46 0.72	2.6664	18 24 46.7	0.677
19	3 43 31.39	2.5116	15 29 7.5	6.480	19	5 48 40.73	2.6672	18 25 23.1	0.538
20	3 46 2.24	2.5167	15 35 33.3	6.380	20	5 51 20.78	2.6678	18 25 51.2	0.399
21	3 48 33.39	2.5217	15 41 53.1	6.279	21	5 54 0.86	2.6683	18 26 11.0	0.260
22	3 51 4.85	2.5267	15 48 6.8	6.177	22	5 56 40.97	2.6687	18 26 22.4	+ 0.130
23	3 53 36.60	2.5317	15 54 14.3	6.073	23	5 59 21.10	2.6690	18 26 25.4	- 0.019
24	3 56 8.65	2.5366	N. 16 0 15.5	5.968	24	6 2 1.25	2.6692	N. 18 26 20.1	0.158

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 13.					MONDAY 15.				
0	h m s	°	N. 18° 26' 20"	0.158	0	h m s	°	N. 15° 45' 7.6"	6.379
1	6 2 1.25	2.6892	18 26 6.4	0.296	1	8 8 5.57	2.5457	15 38 47.7	6.384
2	6 4 41.40	2.6892	18 25 44.3	0.437	2	8 10 38.17	2.5410	15 32 21.5	6.488
3	6 7 21.55	2.6890	18 25 13.9	0.577	3	8 13 10.49	2.5369	15 25 49.1	6.591
4	6 10 1.68	2.6887	18 24 35.1	0.716	4	8 15 42.52	2.5315	15 19 10.6	6.692
5	6 12 41.79	2.6883	18 23 48.0	0.855	5	8 18 14.27	2.5267	15 12 26.1	6.791
6	6 15 21.88	2.6879	18 22 52.5	0.994	6	8 20 45.73	2.5218	15 5 35.7	6.889
7	6 18 1.94	2.6873	18 21 48.7	1.133	7	8 23 16.89	2.5169	14 44 29.4	6.987
8	6 20 41.96	2.6866	18 20 36.6	1.272	8	8 25 47.76	2.5120	14 37 15.9	7.083
9	6 23 21.93	2.6857	18 19 16.1	1.410	9	8 28 18.33	2.5071	14 29 56.8	7.178
10	6 26 1.84	2.6847	18 17 47.4	1.547	10	8 30 48.61	2.5021	14 22 32.3	7.272
11	6 28 41.69	2.6836	18 16 10.4	1.685	11	8 33 18.58	2.4970	14 15 2.4	7.364
12	6 31 21.47	2.6824	18 14 25.2	1.822	12	8 35 48.25	2.4920	13 52 1.0	7.453
13	6 34 1.18	2.6811	18 12 31.7	1.959	13	8 38 17.62	2.4869	13 44 10.3	7.540
14	6 36 40.80	2.6796	18 10 30.1	2.095	14	8 40 46.68	2.4817	13 36 14.6	7.626
15	6 39 20.33	2.6781	18 8 20.3	2.232	15	8 43 15.43	2.4766	13 28 8.5	7.711
16	6 41 59.77	2.6764	18 6 2.3	2.368	16	8 45 43.87	2.4714	13 20 58.3	7.796
17	6 44 39.10	2.6746	18 3 36.2	2.503	17	8 48 12.00	2.4662	13 13 43.4	7.880
18	6 47 18.32	2.6727	18 1 2.0	2.638	18	8 50 39.82	2.4611	13 6 24.3	7.963
19	6 49 57.42	2.6706	17 58 19.7	2.771	19	8 53 7.33	2.4558	12 59 19.9	8.045
20	6 52 36.39	2.6685	17 55 29.4	2.904	20	8 55 34.52	2.4506	12 51 58.3	8.126
21	6 55 15.24	2.6663	17 52 31.3	3.036	21	8 58 1.40	2.4453	12 44 2.4	8.206
22	6 57 53.05	2.6639	17 49 25.2	3.167	22	9 0 27.96	2.4401	12 36 5.7	8.285
23	7 0 32.51	2.6614	N. 17° 46' 11.2"	3.299	23	9 2 54.21	2.4348	12 28 23.9	8.363
24	7 3 10.92	2.6588				9 5 20.14	2.4295		
SUNDAY 14.					TUESDAY 16.				
0	7 5 49.17	2.6562	N. 17° 42' 49.3"	3.430	0	9 7 45.75	2.4242	N. 12° 46' 59.9"	8.437
1	7 8 27.26	2.6534	17 39 19.6	3.559	1	9 10 11.04	2.4189	12 38 31.5	8.510
2	7 11 5.18	2.6505	17 35 42.2	3.688	2	9 12 36.02	2.4136	12 29 58.7	8.582
3	7 13 42.92	2.6475	17 31 57.1	3.816	3	9 15 0.68	2.4083	12 21 21.7	8.651
4	7 16 20.48	2.6445	17 28 4.3	3.943	4	9 17 25.02	2.4031	12 12 40.6	8.720
5	7 18 57.86	2.6413	17 24 3.9	4.070	5	9 19 49.05	2.3978	12 3 55.3	8.788
6	7 21 35.04	2.6380	17 19 55.9	4.196	6	9 22 12.76	2.3925	11 55 6.0	8.854
7	7 24 12.02	2.6347	17 15 40.4	4.320	7	9 24 36.15	2.3872	11 46 12.8	8.919
8	7 26 48.80	2.6312	17 11 17.5	4.444	8	9 26 59.23	2.3819	11 37 15.7	8.982
9	7 29 25.37	2.6277	17 6 47.2	4.567	9	9 29 21.99	2.3767	11 28 14.9	9.044
10	7 32 1.73	2.6242	17 2 9.5	4.688	10	9 31 44.44	2.3715	11 19 10.4	9.105
11	7 34 37.87	2.6204	16 57 24.6	4.808	11	9 34 6.57	2.3663	11 10 2.3	9.165
12	7 37 13.78	2.6166	16 52 32.5	4.928	12	9 36 28.39	2.3611	11 0 50.6	9.223
13	7 39 49.46	2.6127	16 47 33.2	5.047	13	9 38 49.90	2.3559	10 51 35.5	9.279
14	7 42 24.91	2.6088	16 42 26.8	5.165	14	9 41 11.10	2.3507	10 42 17.1	9.335
15	7 45 0.12	2.6048	16 37 13.4	5.282	15	9 43 31.98	2.3454	10 32 55.3	9.390
16	7 47 35.08	2.6007	16 31 53.0	5.397	16	9 45 52.55	2.3403	10 23 30.3	9.443
17	7 50 9.80	2.5966	16 26 25.8	5.511	17	9 48 12.82	2.3352	10 14 2.2	9.494
18	7 52 44.27	2.5923	16 20 51.7	5.625	18	9 50 32.78	2.3302	10 4 31.0	9.544
19	7 55 18.48	2.5880	16 15 10.8	5.737	19	9 52 52.44	2.3251	9 54 56.9	9.593
20	7 57 52.43	2.5837	16 9 23.2	5.847	20	9 55 11.79	2.3200	9 45 19.9	9.641
21	8 0 26.12	2.5792	16 3 29.1	5.957	21	9 57 30.84	2.3150	9 35 40.0	9.687
22	8 2 50.54	2.5747	15 57 28.4	6.066	22	9 59 49.59	2.3100	9 25 57.4	9.733
23	8 5 32.69	2.5702	15 51 21.2	6.173	23	10 2 8.04	2.3050	9 16 12.2	9.778
24	8 8 5.57	2.5657	N. 15° 45' 7.6"	6.279	24	10 4 26.19	2.3001	N. 9° 6' 24.3"	9.819

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 17.					FRIDAY 19.				
0	10 4 26.19	2.3001	N. 9° 6' 24.3"	9.819	0	11 49 55.06	2.1198	N. 0° 48' 9.2"	10.537
1	10 6 44.05	2.3050	8 56 33.9	9.860	1	11 52 1.75	2.1101	0 37 37.2	10.528
2	10 9 1.62	2.3003	8 46 41.1	9.899	2	11 54 8.26	2.1075	0 27 5.8	10.519
3	10 11 18.89	2.2954	8 36 46.0	9.938	3	11 56 14.65	2.1049	0 16 34.9	10.509
4	10 13 35.87	2.2906	8 26 48.6	9.976	4	11 58 20.87	2.1094	N. 0 6 4.7	10.497
5	10 15 52.57	2.2759	8 16 48.9	10.013	5	12 0 26.94	2.0990	S. 0 4 24.7	10.484
6	10 18 8.98	2.2719	8 6 47.1	10.048	6	12 2 32.86	2.0975	0 14 53.4	10.471
7	10 20 25.11	2.2665	7 56 43.2	10.089	7	12 4 38.64	2.0951	0 25 21.3	10.457
8	10 22 40.96	2.2618	7 46 37.3	10.114	8	12 6 44.27	2.0927	0 35 48.3	10.448
9	10 24 56.53	2.2573	7 36 29.5	10.146	9	12 8 49.76	2.0904	0 46 14.4	10.437
10	10 27 11.83	2.2537	7 26 19.8	10.177	10	12 10 55.12	2.0888	0 56 39.6	10.411
11	10 29 26.85	2.2491	7 16 8.3	10.205	11	12 13 0.34	2.0859	1 7 3.7	10.394
12	10 31 41.60	2.2436	7 5 55.2	10.233	12	12 15 5.43	2.0838	1 17 26.8	10.376
13	10 33 56.08	2.2391	6 55 40.4	10.260	13	12 17 10.40	2.0817	1 27 48.8	10.357
14	10 36 10.29	2.2347	6 45 24.0	10.286	14	12 19 15.24	2.0797	1 38 9.6	10.338
15	10 38 24.24	2.2303	6 35 6.1	10.310	15	12 21 19.96	2.0777	1 48 29.3	10.318
16	10 40 37.93	2.2260	6° 24' 46.8	10.333	16	12 23 24.57	2.0758	1 58 47.8	10.297
17	10 42 51.36	2.2217	6 14 26.1	10.356	17	12 25 29.06	2.0739	2 9 4.9	10.274
18	10 45 4.54	2.2175	6 4 4.1	10.377	18	12 27 33.44	2.0721	2 19 20.7	10.259
19	10 47 17.46	2.2132	5 53 40.8	10.397	19	12 29 37.71	2.0703	2 29 35.2	10.239
20	10 49 30.13	2.2091	5 43 16.4	10.416	20	12 31 41.88	2.0686	2 39 48.2	10.205
21	10 51 42.55	2.2050	5 32 50.9	10.434	21	12 33 45.94	2.0669	2 49 59.8	10.181
22	10 53 54.73	2.2010	5 22 24.3	10.451	22	12 35 49.90	2.0652	3 0 9.9	10.156
23	10 56 6.67	2.1970	N. 5 11 56.8	10.466	23	12 37 53.76	2.0636	S. 3 10 18.5	10.130
THURSDAY 18.					SATURDAY 20.				
0	10 58 18.37	2.1930	N. 5 1 28.4	10.480	0	12 39 57.53	2.0601	S. 3 20 25.5	10.103
1	11 0 29.83	2.1891	4 50 59.2	10.494	1	12 42 1.21	2.0606	3 30 30.8	10.075
2	11 2 41.06	2.1859	4 40 29.2	10.507	2	12 44 4.80	2.0591	3 40 34.5	10.047
3	11 4 52.06	2.1814	4 29 58.4	10.519	3	12 46 8.30	2.0577	3 50 36.5	10.018
4	11 7 2.83	2.1777	4 19 26.9	10.530	4	12 48 11.72	2.0563	4 0 36.7	9.989
5	11 9 13.38	2.1739	4 8 54.8	10.539	5	12 50 15.06	2.0551	4 10 35.2	9.960
6	11 11 23.70	2.1709	3 58 22.2	10.547	6	12 52 18.33	2.0538	4 20 31.9	9.939
7	11 13 33.80	2.1666	3 47 49.1	10.555	7	12 54 21.52	2.0526	4 30 26.7	9.897
8	11 15 43.69	2.1631	3 37 15.6	10.562	8	12 56 24.64	2.0514	4 40 19.6	9.865
9	11 17 53.37	2.1596	3 26 41.7	10.567	9	12 58 27.69	2.0503	4 50 10.5	9.832
10	11 20 2.84	2.1561	3 16 7.6	10.571	10	13 0 30.67	2.0499	4 59 59.4	9.798
11	11 22 12.10	2.1526	3 5 33.2	10.575	11	13 2 33.59	2.0481	5 9 46.3	9.765
12	11 24 21.15	2.1492	2 54 58.6	10.577	12	13 4 36.44	2.0470	5 19 31.2	9.731
13	11 26 30.00	2.1459	2 44 23.9	10.579	13	13 6 39.23	2.0461	5 29 14.0	9.695
14	11 28 38.66	2.1427	2 33 49.1	10.580	14	13 8 41.97	2.0459	5 38 54.6	9.658
15	11 30 47.13	2.1395	2 23 14.3	10.580	15	13 10 44.66	2.0444	5 48 33.0	9.622
16	11 32 55.40	2.1363	2 12 39.5	10.579	16	13 12 47.30	2.0436	5 58 9.2	9.585
17	11 35 3.48	2.1339	2 2 4.8	10.577	17	13 14 49.89	2.0428	6 7 43.2	9.548
18	11 37 11.38	2.1309	1 51 30.3	10.573	18	13 16 52.43	2.0420	6 17 15.0	9.510
19	11 39 19.10	2.1279	1 40 56.0	10.570	19	13 18 54.93	2.0413	6 26 44.4	9.470
20	11 41 26.64	2.1242	1 30 21.9	10.566	20	13 20 57.39	2.0407	6 36 11.4	9.430
21	11 43 34.00	2.1213	1 19 48.1	10.560	21	13 22 59.81	2.0400	6 45 36.0	9.390
22	11 45 41.19	2.1184	1 9 14.7	10.553	22	13 25 2.19	2.0394	6 54 58.2	9.349
23	11 47 48.21	2.1156	0 58 41.7	10.546	23	13 27 4.54	2.0388	7 4 17.9	9.307
24	11 49 55.06	2.1128	N. 0 48 9.2	10.537	24	13 29 6.85	2.0389	S. 7 13 35.1	9.265

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 21.					TUESDAY 23.				
0	<sup>h</sup> 13 <sup>m</sup> 29 <sup>s</sup> 6.85	2.0389	S. 7° 13' 35.1"	9.965	0	<sup>h</sup> 15 <sup>m</sup> 6 <sup>s</sup> 58.14	2.0485	S. 13° 39' 31.2"	6.690
1	13 31 9.13	2.0378	7 22 49.7	9.923	1	15 9 1.07	2.0492	13 46 6.4	6.554
2	13 33 11.39	2.0374	7 32 1.8	9.180	2	15 11 4.04	2.0499	13 52 37.6	6.487
3	13 35 13.62	2.0370	7 41 11.3	9.136	3	15 13 7.06	2.0506	13 59 4.8	6.419
4	13 37 15.83	2.0367	7 50 18.1	9.092	4	15 15 10.12	2.0513	14 5 27.9	6.350
5	13 39 18.02	2.0363	7 59 22.3	9.047	5	15 17 13.22	2.0521	14 11 46.8	6.281
6	13 41 20.19	2.0360	8 8 23.8	9.002	6	15 19 16.37	2.0528	14 18 1.6	6.219
7	13 43 22.34	2.0358	8 17 22.5	8.955	7	15 21 19.56	2.0536	14 24 12.3	6.143
8	13 45 24.48	2.0356	8 26 18.4	8.908	8	15 23 22.80	2.0543	14 30 18.8	6.073
9	13 47 26.61	2.0354	8 35 11.5	8.861	9	15 25 26.08	2.0551	14 36 21.1	6.003
10	13 49 28.73	2.0352	8 44 1.7	8.813	10	15 27 29.41	2.0558	14 42 19.2	5.933
11	13 51 30.84	2.0351	8 52 49.1	8.766	11	15 29 32.78	2.0566	14 48 13.1	5.862
12	13 53 32.94	2.0350	9 1 33.6	8.717	12	15 31 36.20	2.0574	14 54 2.7	5.791
13	13 55 35.04	2.0350	9 10 15.1	8.667	13	15 33 39.67	2.0582	14 59 48.0	5.719
14	13 57 37.14	2.0349	9 18 53.6	8.617	14	15 35 43.18	2.0589	15 5 29.0	5.647
15	13 59 39.23	2.0348	9 27 29.2	8.567	15	15 37 46.74	2.0597	15 11 5.6	5.574
16	14 1 41.32	2.0349	9 36 1.7	8.516	16	15 39 50.34	2.0604	15 16 37.9	5.502
17	14 3 43.42	2.0350	9 44 31.1	8.464	17	15 41 53.99	2.0612	15 22 5.8	5.428
18	14 5 45.52	2.0351	9 52 57.4	8.412	18	15 43 57.69	2.0620	15 27 29.3	5.355
19	14 7 47.63	2.0352	10 1 20.5	8.359	19	15 46 1.43	2.0628	15 32 48.4	5.281
20	14 9 49.75	2.0354	10 9 40.5	8.306	20	15 48 5.22	2.0636	15 38 3.0	5.207
21	14 11 51.88	2.0356	10 17 57.3	8.253	21	15 50 9.06	2.0643	15 43 13.2	5.134
22	14 13 54.02	2.0358	10 26 10.8	8.198	22	15 52 12.94	2.0651	15 48 18.9	5.057
23	14 15 56.17	2.0360	S. 10° 34' 21.1"	8.144	23	15 54 16.87	2.0658	S. 15° 53' 20.1"	4.982
MONDAY 22.					WEDNESDAY 24.				
0	14 17 58.34	2.0369	S. 10° 42' 28.1"	8.089	0	15 56 20.84	2.0666	S. 15° 58' 16.7"	4.906
1	14 20 0.52	2.0365	10 50 31.8	8.033	1	15 58 24.86	2.0673	16 3 8.8	4.830
2	14 22 2.72	2.0368	10 58 32.1	7.977	2	16 0 28.92	2.0681	16 7 56.3	4.754
3	14 24 4.94	2.0372	11 6 29.0	7.920	3	16 2 33.03	2.0688	16 12 30.3	4.678
4	14 26 7.18	2.0375	11 11 22.5	7.862	4	16 4 37.18	2.0695	16 17 17.7	4.601
5	14 28 9.44	2.0379	11 22 12.5	7.805	5	16 6 41.37	2.0702	16 21 51.4	4.523
6	14 30 11.73	2.0383	11 29 59.1	7.747	6	16 8 45.61	2.0710	16 26 20.5	4.446
7	14 32 14.04	2.0387	11 37 42.2	7.688	7	16 10 49.89	2.0717	16 30 44.9	4.368
8	14 34 16.38	2.0392	11 45 21.7	7.629	8	16 12 54.21	2.0724	16 35 4.6	4.290
9	14 36 18.74	2.0396	11 52 57.7	7.570	9	16 14 58.57	2.0731	16 39 19.7	4.213
10	14 38 21.13	2.0401	12 0 30.1	7.510	10	16 17 2.98	2.0738	16 43 30.1	4.133
11	14 40 23.55	2.0406	12 7 58.9	7.450	11	16 19 7.43	2.0745	16 47 35.7	4.053
12	14 42 26.00	2.0411	12 15 24.1	7.389	12	16 21 11.92	2.0751	16 51 36.5	3.974
13	14 44 28.48	2.0417	12 22 45.6	7.327	13	16 23 16.45	2.0757	16 55 32.6	3.895
14	14 46 31.00	2.0422	12 30 3.4	7.265	14	16 25 21.01	2.0763	16 59 23.9	3.815
15	14 48 33.55	2.0427	12 37 17.4	7.203	15	16 27 25.61	2.0770	17 3 10.4	3.735
16	14 50 36.13	2.0433	12 44 27.7	7.140	16	16 29 30.25	2.0776	17 6 52.1	3.655
17	14 52 38.75	2.0439	12 51 34.2	7.076	17	16 31 34.92	2.0782	17 10 29.0	3.575
18	14 54 41.40	2.0445	12 58 36.8	7.012	18	16 33 39.63	2.0787	17 14 1.1	3.494
19	14 56 44.09	2.0452	13 5 35.6	6.947	19	16 35 44.37	2.0793	17 17 28.3	3.413
20	14 58 46.82	2.0458	13 12 30.5	6.883	20	16 37 49.15	2.0799	17 20 50.6	3.332
21	15 0 49.59	2.0465	13 19 21.6	6.819	21	16 39 53.96	2.0804	17 24 8.1	3.251
22	15 2 52.40	2.0472	13 26 8.8	6.753	22	16 41 58.80	2.0809	17 27 20.7	3.168
23	15 4 55.25	2.0478	13 32 52.0	6.687	23	16 44 3.67	2.0814	17 30 28.3	3.086
24	15 6 58.14	2.0485	S. 13° 39' 31.2"	6.620	24	16 46 8.57	2.0819	S. 17° 33' 31.0"	3.004

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 25.					SATURDAY 27.				
0	16 46 8.57	2.0819	S. 17° 33' 31.0	3.004	0	18 26 13.41	2.0790	S. 18° 20' 53.0	1.045
1	16 46 13.50	2.0823	17 36 28.8	2.992	1	18 28 18.13	2.0783	18 19 47.8	1.199
2	16 50 18.45	2.0828	17 39 21.6	2.839	2	18 30 22.81	2.0776	18 18 37.5	1.313
3	16 52 23.43	2.0833	17 42 9.5	2.757	3	18 32 27.45	2.0769	18 17 22.2	1.997
4	16 54 28.44	2.0837	17 44 52.4	2.674	4	18 34 32.04	2.0762	18 16 1.9	1.380
5	16 56 33.47	2.0840	17 47 30.4	2.591	5	18 36 36.59	2.0755	18 14 36.6	1.464
6	16 58 38.52	2.0843	17 50 3.4	2.508	6	18 38 41.10	2.0747	18 13 6.2	1.547
7	17 0 43.59	2.0847	17 52 31.4	2.425	7	18 40 45.56	2.0739	18 11 30.9	1.630
8	17 2 48.68	2.0851	17 54 54.4	2.342	8	18 42 49.97	2.0731	18 9 50.6	1.713
9	17 4 53.80	2.0854	17 57 12.4	2.258	9	18 44 54.33	2.0723	18 8 5.3	1.796
10	17 6 58.93	2.0857	17 59 25.3	2.174	10	18 46 58.64	2.0714	18 6 15.1	1.878
11	17 9 4.08	2.0860	18 1 33.2	2.090	11	18 49 2.90	2.0706	18 4 20.0	1.960
12	17 11 9.25	2.0863	18 3 36.1	2.007	12	18 51 7.11	2.0697	18 2 19.9	2.042
13	17 13 14.43	2.0864	18 5 34.0	1.923	13	18 53 11.26	2.0687	18 0 14.9	2.194
14	17 15 19.62	2.0866	18 7 26.8	1.838	14	18 55 15.35	2.0677	17 58 5.0	2.306
15	17 17 24.82	2.0867	18 9 14.5	1.753	15	18 57 19.39	2.0668	17 55 50.2	2.387
16	17 19 30.03	2.0869	18 10 57.2	1.669	16	18 59 23.37	2.0658	17 53 30.5	2.368
17	17 21 35.25	2.0871	18 12 34.8	1.584	17	19 1 27.29	2.0648	17 51 6.0	2.449
18	17 23 40.48	2.0873	18 14 7.3	1.499	18	19 3 31.15	2.0638	17 48 36.6	2.530
19	17 25 45.71	2.0873	18 15 34.7	1.415	19	19 5 34.95	2.0627	17 46 2.4	2.611
20	17 27 50.95	2.0873	18 16 57.1	1.331	20	19 7 38.68	2.0617	17 43 23.3	2.692
21	17 29 56.19	2.0874	18 18 14.4	1.245	21	19 9 42.35	2.0607	17 40 39.4	2.772
22	17 32 1.44	2.0874	18 19 26.5	1.160	22	19 11 45.96	2.0596	17 37 50.7	2.852
23	17 34 6.68	2.0873	S. 18 20 33.6	1.076	23	19 13 49.50	2.0584	S. 17 34 57.2	2.931
FRIDAY 26.					SUNDAY 28.				
0	17 36 11.92	2.0873	S. 18 21 35.6	0.991	0	19 15 52.97	2.0573	S. 17 31 59.0	3.010
1	17 38 17.16	2.0873	18 22 32.5	0.906	1	19 17 56.37	2.0561	17 28 56.0	3.089
2	17 40 22.39	2.0873	18 23 24.3	0.820	2	19 19 59.70	2.0550	17 25 48.3	3.167
3	17 42 27.62	2.0871	18 24 10.9	0.734	3	19 22 2.97	2.0539	17 22 35.9	3.246
4	17 44 32.84	2.0869	18 24 52.4	0.650	4	19 24 6.17	2.0527	17 19 18.8	3.324
5	17 46 38.05	2.0868	18 25 28.9	0.566	5	19 26 9.29	2.0514	17 15 57.0	3.402
6	17 48 43.26	2.0866	18 26 0.3	0.481	6	19 28 12.34	2.0502	17 12 30.5	3.480
7	17 50 48.45	2.0864	18 26 26.6	0.395	7	19 30 15.32	2.0490	17 8 59.4	3.557
8	17 52 53.63	2.0862	18 26 47.7	0.309	8	19 32 18.22	2.0477	17 5 23.7	3.634
9	17 54 58.79	2.0859	18 27 3.7	0.225	9	19 34 21.05	2.0465	17 1 43.3	3.711
10	17 57 3.93	2.0856	18 27 14.7	0.140	10	19 36 23.80	2.0452	16 57 58.3	3.787
11	17 59 9.06	2.0853	18 27 20.5	-0.054	11	19 38 26.48	2.0440	16 54 8.8	3.863
12	18 1 14.17	2.0850	18 27 21.2	+0.031	12	19 40 29.08	2.0427	16 50 14.8	3.938
13	18 3 19.26	2.0846	18 27 16.8	0.116	13	19 42 31.60	2.0413	16 46 16.2	4.014
14	18 5 24.32	2.0843	18 27 7.3	0.200	14	19 44 34.04	2.0400	16 42 13.1	4.089
15	18 7 29.36	2.0838	18 26 52.8	0.285	15	19 46 36.40	2.0387	16 38 5.5	4.164
16	18 9 34.38	2.0834	18 26 33.1	0.371	16	19 48 38.69	2.0375	16 33 53.4	4.238
17	18 11 39.37	2.0829	18 26 8.3	0.455	17	19 50 40.90	2.0362	16 29 36.9	4.313
18	18 13 44.33	2.0824	18 25 38.5	0.539	18	19 52 43.03	2.0348	16 25 16.0	4.388
19	18 15 49.26	2.0819	18 25 3.6	0.624	19	19 54 45.08	2.0335	16 20 50.6	4.459
20	18 17 54.16	2.0813	18 24 23.6	0.709	20	19 56 47.05	2.0321	16 16 20.9	4.532
21	18 19 59.02	2.0808	18 23 38.5	0.793	21	19 58 48.93	2.0307	16 11 46.8	4.606
22	18 22 3.85	2.0803	18 22 48.4	0.878	22	20 0 50.73	2.0293	16 7 8.3	4.677
23	18 24 8.65	2.0797	18 21 53.2	0.962	23	20 2 52.45	2.0280	16 2 25.5	4.749
24	18 26 13.41	2.0790	S. 18 20 53.0	1.045	24	20 4 54.09	2.0267	S. 15 57 38.4	4.821



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.

Right Ascension.

Diff. for 1 Minute.

Declination.

Diff. for 1 Minute.

Hour.

Right Ascension.

Diff. for 1 Minute.

Declination.

Diff. for 1 Minute.

MONDAY 29.

0

20 4 54.09

2.0267

S. 15° 57' 38.4"

4.821

1

20 6 55.65

2.0253

15 52 47.0

4.892

2

20 8 57.12

2.0239

15 47 51.4

4.963

3

20 10 58.51

2.0225

15 42 51.5

5.033

4

20 12 59.82

2.0212

15 37 47.4

5.102

5

20 15 1.05

2.0198

15 32 39.2

5.171

6

20 17 2.19

2.0184

15 27 26.6

5.240

7

20 19 3.25

2.0170

15 22 10.4

5.309

8

20 21 4.23

2.0156

15 16 49.8

5.377

9

20 23 5.12

2.0142

15 11 25.1

5.446

10

20 25 5.93

2.0128

15 5 56.3

5.514

11

20 27 6.66

2.0115

15 0 23.4

5.582

12

20 29 7.31

2.0102

14 54 46.5

5.648

13

20 31 7.88

2.0088

14 49 5.6

5.714

14

20 33 8.36

2.0074

14 43 20.8

5.779

15

20 35 8.76

2.0060

14 37 32.1

5.844

16

20 37 9.08

2.0047

14 31 39.5

5.909

17

20 39 9.32

2.0033

14 25 43.0

5.974

18

20 41 9.48

2.0020

14 19 42.6

6.039

19

20 43 9.56

2.0007

14 13 38.3

6.102

20

20 45 9.56

1.9993

14 7 30.3

6.165

21

20 47 9.48

1.9980

14 1 18.5

6.228

22

20 49 9.32

1.9967

13 55 2.9

6.291

23

20 51 9.09

1.9955

S. 13 48 43.6

6.353

TUESDAY 30.

0

20 53 8.78

1.9942

S. 13 42 20.6

6.414

1

20 55 8.39

1.9929

13 35 53.9

6.475

2

20 57 7.93

1.9917

13 29 23.6

6.535

3

20 59 7.39

1.9904

13 22 49.7

6.595

4

21 1 6.78

1.9892

13 16 12.2

6.655

5

21 3 6.09

1.9879

13 9 31.1

6.715

6

21 5 5.33

1.9867

13 2 46.4

6.774

7

21 7 4.50

1.9856

12 55 58.2

6.832

8

21 9 3.60

1.9844

12 49 6.5

6.890

9

21 11 2.62

1.9832

12 42 11.4

6.947

10

21 13 1.58

1.9821

12 35 12.9

7.003

11

21 15 0.47

1.9809

12 28 11.0

7.060

12

21 16 59.29

1.9798

12 21 5.7

7.117

13

21 18 58.05

1.9787

12 13 57.0

7.172

14

21 20 56.74

1.9777

12 6 45.0

7.227

15

21 22 55.37

1.9767

11 59 29.8

7.281

16

21 24 53.94

1.9757

11 52 11.3

7.335

17

21 26 52.45

1.9746

11 44 49.6

7.389

18

21 28 50.89

1.9736

11 37 24.6

7.442

19

21 30 49.28

1.9727

11 29 56.5

7.495

20

21 32 47.61

1.9717

11 22 25.2

7.547

21

21 34 45.88

1.9708

11 14 50.8

7.599

22

21 36 44.10

1.9699

11 7 13.3

7.651

23

21 38 42.27

1.9691

10 59 32.7

7.703

24

21 40 40.39

1.9682

S. 10 51 49.1

7.752

WEDNESDAY, JULY 1.

0

21 40 40.39

1.9689

S. 10° 51' 49.1"

7.752

PHASES OF THE MOON.

☾ Last Quarter.

June

5

12

4.8

● New Moon

12

10

42.1

☾ First Quarter

19

1

48.4

○ Full Moon

26

23

17.9

☾ Perigee.

June

13

4.3

☾ Apogee.

27

18.0

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Spica W.	89° 6' 39"	3085	90° 35' 7"	3085	92° 3' 35"	3084	93° 32' 4"	3082
	Antares W.	43 57 51	3190	45 24 12	3183	46 50 41	3178	48 17 16	3173
	Fomalhaut E.	47 51 7	3238	46 36 44	3275	45 22 59	3217	44 9 56	3209
	α Pegasi E.	60 49 34	3386	59 27 2	3396	58 4 41	3406	56 42 31	3415
	α Arietis E.	103 44 30	3190	102 18 18	3188	100 51 55	3187	99 25 30	3185
	SUN E.	139 40 35	3477	138 19 45	3474	136 58 52	3473	135 37 57	3470
2	Spica W.	100 54 57	3073	102 23 40	3070	103 52 26	3067	105 21 16	3063
	Antares W.	55 31 53	3145	56 59 8	3138	58 26 31	3133	59 54 1	3126
	Fomalhaut E.	38 17 28	4968	37 10 6	4351	36 4 0	4444	34 59 18	4548
	α Pegasi E.	49 54 54	3480	48 34 8	3497	47 13 41	3515	45 53 34	3535
	α Arietis E.	92 12 46	3173	90 46 3	3168	89 19 16	3168	87 52 26	3163
	MARS E.	105 13 59	3345	103 50 40	3343	102 27 17	3338	101 3 50	3334
	SUN E.	128 52 34	3453	127 31 17	3449	126 9 56	3445	124 48 30	3439
3	Antares W.	67 13 29	3099	68 41 48	3085	70 10 16	3077	71 38 54	3069
	α Aquilæ W.	29 12 48	5819	29 59 56	5557	30 50 0	5396	31 42 48	5194
	α Pegasi E.	39 19 16	3673	38 2 0	3711	36 45 25	3756	35 29 37	3806
	α Arietis E.	80 37 2	3139	79 9 40	3134	77 42 12	3129	76 14 38	3124
	MARS E.	94 5 12	3306	92 41 8	3300	91 16 57	3294	89 52 38	3286
	SUN E.	117 59 47	3409	116 37 41	3402	115 15 27	3395	113 53 5	3386
4	Antares W.	79 4 39	3093	80 34 23	3014	82 4 19	3003	83 34 28	2999
	α Aquilæ W.	36 41 8	4395	37 46 34	4290	38 53 36	4194	40 2 8	4105
	α Arietis E.	68 55 3	3093	67 26 45	3086	65 58 18	3079	64 29 43	3072
	MARS E.	82 48 40	3949	81 23 21	3932	79 57 50	3920	78 32 5	3909
	SUN E.	106 58 44	3340	105 35 19	3329	104 11 41	3319	102 47 51	3307
5	Antares W.	91 8 45	2934	92 40 21	2921	94 12 13	2908	95 44 22	2894
	α Aquilæ W.	46 4 14	3757	47 20 1	3702	48 36 46	3649	49 54 27	3599
	α Arietis E.	57 4 37	3037	55 35 10	3030	54 5 34	3023	52 35 50	3018
	MARS E.	71 19 57	3149	69 52 47	3135	68 25 20	3122	66 57 37	3108
	SUN E.	95 45 11	3243	94 19 53	3230	92 54 19	3215	91 28 28	3200
6	Antares W.	103 29 30	2994	105 3 27	2989	106 37 43	2974	108 12 19	2779
	α Aquilæ W.	56 35 34	3386	57 58 6	3350	59 21 20	3314	60 45 15	3290
	α Arietis E.	45 5 27	2993	43 35 6	2993	42 4 44	2992	40 34 21	2993
	MARS E.	59 34 33	3031	58 4 59	3015	56 35 5	2998	55 4 50	2981
	SUN E.	84 14 39	3181	82 46 55	3105	81 18 51	3087	79 50 26	3069
7	α Aquilæ W.	67 54 29	3194	69 22 9	3096	70 50 23	3069	72 19 11	3042
	Fomalhaut W.	37 43 38	3791	38 58 50	3693	40 15 45	3603	41 34 16	3520
	α Pegasi W.	23 12 25	4745	24 12 47	4486	25 17 9	4231	26 25 6	4030
	MARS E.	47 28 14	2994	45 55 48	2977	44 23 0	2959	42 49 48	2941
	SUN E.	72 22 51	2978	70 52 11	2960	69 21 8	2941	67 49 41	2921
8	α Aquilæ W.	79 51 11	2918	81 23 7	2896	82 55 31	2874	84 28 23	2853
	Fomalhaut W.	48 27 43	3192	49 54 2	3138	51 21 25	3087	52 49 50	3040
	α Pegasi W.	32 47 14	3355	34 10 22	3264	35 35 16	3181	37 1 48	3106
	MARS E.	34 57 59	2752	33 22 28	2734	31 46 34	2718	30 10 18	2709
	SUN E.	60 6 16	2925	58 32 20	2905	56 57 59	2766	55 23 13	2767
9	Fomalhaut W.	60 25 32	2940	61 59 8	2905	63 33 29	2773	65 8 33	2741

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Spica W.	95° 0' 35"	3081	96° 29' 8"	3080	97° 57' 42"	3078	99° 26' 18"	3076
	Antares W.	49 43 58	3167	51 10 47	3162	52 37 42	3156	54 4 44	3150
	Fomalhaut E.	42 57 39	4012	41 46 11	4066	40 35 36	4137	39 26 0	4194
	α Pegasi E.	55 20 32	3486	53 58 45	3439	52 37 13	3453	51 15 56	3466
	α Arietis E.	97 59 3	3183	96 32 34	3181	95 6 2	3178	93 39 26	3174
	SUN E.	134 16 59	3467	132 55 58	3464	131 34 54	3461	130 13 46	3457
2	Spica W.	106 50 11	3059	108 19 11	3055	109 48 16	3049	111 17 28	3044
	Antares W.	61 21 39	3119	62 49 25	3114	64 17 18	3107	65 45 19	3100
	Fomalhaut E.	33 56 8	4066	32 54 40	4001	31 55 5	4054	30 57 33	5137
	α Pegasi E.	44 33 49	3557	43 14 28	3581	41 55 33	3609	40 37 8	3639
	α Arietis E.	86 25 32	3158	84 58 33	3153	83 31 28	3149	82 4 18	3144
	MARS E.	99 40 18	3330	98 16 41	3325	96 52 58	3319	95 29 8	3313
	SUN E.	123 26 58	3434	122 5 20	3429	120 43 36	3423	119 21 45	3416
3	Antares W.	73 7 41	3061	74 36 38	3052	76 5 47	3043	77 35 7	3033
	α Aquilæ W.	32 38 7	4045	33 35 46	4783	34 35 36	4640	35 37 26	4511
	α Pegasi E.	34 14 41	3892	33 0 43	3927	31 47 51	4003	30 36 14	4080
	α Arietis E.	74 46 58	3119	73 19 11	3119	71 51 16	3105	70 23 13	3100
	MARS E.	88 28 10	3278	87 3 33	3270	85 38 46	3260	84 13 48	3252
	SUN E.	112 30 33	3378	111 7 51	3369	109 44 59	3360	108 21 57	3351
4	Antares W.	85 4 51	2981	86 35 28	2989	88 6 19	2958	89 37 25	2946
	α Aquilæ W.	41 12 5	4095	42 23 20	3949	43 35 50	3891	44 49 29	3817
	α Arietis E.	63 0 59	3065	61 32 6	3058	60 3 5	3051	58 33 55	3044
	MARS E.	77 6 7	3196	75 39 55	3187	74 13 30	3175	72 46 51	3162
	SUN E.	101 23 48	3295	99 59 31	3282	98 34 59	3270	97 10 13	3257
5	Antares W.	97 16 48	2980	98 49 32	2967	100 22 33	2953	101 55 52	2938
	α Aquilæ W.	51 13 2	3553	52 32 28	3506	53 52 43	3465	55 13 46	3425
	α Pegasi E.	51 5 59	3019	49 36 1	3006	48 5 56	3001	46 35 44	2997
	MARS E.	65 29 37	3093	64 1 19	3078	62 32 43	3063	61 3 48	3047
	SUN E.	90 2 19	3185	88 35 52	3170	87 9 7	3154	85 42 3	3138
6	Antares W.	109 47 14	2764	111 22 29	2748	112 58 5	2732	114 34 2	2716
	α Aquilæ W.	62 9 50	3947	63 35 4	3914	65 0 56	3183	66 27 25	3154
	α Arietis E.	39 3 59	2996	37 33 41	3001	36 3 30	3010	34 33 30	3023
	MARS E.	53 34 14	2965	52 3 17	2947	50 31 58	2930	49 0 17	2912
	SUN E.	78 21 39	3052	76 52 31	3034	75 23 1	3016	73 53 8	2997
7	α Aquilæ W.	73 48 32	3016	75 18 25	2990	76 48 50	2966	78 19 45	2942
	Fomalhaut W.	42 54 18	3445	44 15 44	3374	45 38 30	3309	47 2 31	3248
	α Pegasi W.	27 36 16	3856	28 50 20	3706	30 7 1	3575	31 26 3	3458
	MARS E.	41 16 13	2993	39 42 15	2904	38 7 53	2787	36 33 8	2769
	SUN E.	66 17 49	2901	64 45 32	2883	63 12 51	2864	61 39 46	2845
8	α Aquilæ W.	86 1 42	2933	87 35 27	2913	89 9 38	2795	90 44 13	2776
	Fomalhaut W.	54 19 13	2996	55 49 31	2954	57 20 41	2914	58 52 42	2876
	α Pegasi W.	38 29 50	3038	39 59 16	2976	41 29 50	2919	43 1 54	2866
	MARS E.	28 33 41	2986	26 56 43	2972	25 19 26	2759	23 41 51	2742
	SUN E.	53 48 2	2748	52 12 26	2729	50 36 25	2710	48 59 59	2692
9	Fomalhaut W.	66 44 18	2712	68 20 42	2684	69 57 43	2657	71 35 20	2632

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Dis.	IIIh.	P. L. of Dis.	VIh.	P. L. of Dis.	IXh.	P. L. of Dis.
9	$\alpha$ Pegasi SUN	W. 44° 34' 57" E. 47 23 9	9817 9875	46° 9' 3" 45 45 55	9779 9857	47° 44' 8" 44 8 17	9799 9839	49° 20' 10" 42 30 15	9889 9893
10	Fomalhaut $\alpha$ Pegasi SUN	W. 73 13 31 W. 57 32 47 E. 34 14 46	9808 9593 9551	74 52 15 59 13 22 32 34 43	9585 9495 9539	76 31 30 60 54 42 30 54 24	9564 9470 9509	78 11 14 62 36 38 29 13 51	9544 9445 9521
14	SUN Regulus JUPITER Spica	W. 22 41 4 E. 42 48 18 E. 44 29 9 E. 96 19 58	9396 9021 9065 9016	24 24 45 40 55 17 42 37 16 94 26 49	9388 9098 9079 9093	26 8 37 39 2 27 40 45 34 92 33 50	9384 9036 9080 9099	27 52 34 37 9 49 38 54 4 90 41 1	9383 9045 9089 9036
15	SUN JUPITER Spica	W. 36 31 46 E. 29 40 36 E. 81 20 4	9405 9151 9089	38 15 13 27 50 54 79 28 37	9414 9166 9093	39 58 28 26 1 35 77 37 27	9423 9183 9104	41 41 30 24 12 42 75 46 34	9433 9309 9116
16	SUN Pollux Spica Antares	W. 50 12 45 W. 25 58 56 E. 66 37 1 E. 112 11 19	9494 9632 9183 9237	51 54 6 27 37 7 64 48 8 110 23 46	9508 9593 9198 9249	53 35 8 29 16 11 62 59 37 108 36 31	9593 9564 9213 9262	55 15 49 30 55 55 61 11 29 106 49 36	9538 9543 9299 9276
17	SUN Pollux Spica Antares	W. 63 33 54 W. 39 19 38 E. 52 16 40 E. 98 0 15	9618 9505 9300 9350	65 12 25 41 0 44 50 30 54 96 15 29	9635 9507 9396 9366	66 50 33 42 41 48 48 45 33 94 31 5	9652 9511 9344 9382	68 28 18 44 22 46 47 0 37 92 47 4	9689 9517 9368 9398
18	SUN Pollux Spica Antares	W. 76 31 18 W. 52 45 16 E. 38 22 20 E. 84 12 50	9755 9554 9451 9481	78 6 45 54 25 8 36 39 58 82 31 10	9773 9569 9470 9497	79 41 48 56 4 46 34 58 2 80 49 53	9790 9580 9489 9515	81 16 29 57 44 9 33 16 33 79 9 0	9808 9592 9508 9532
19	SUN Pollux Regulus JUPITER Antares	W. 89 4 17 W. 65 56 51 W. 29 8 34 W. 26 50 10 E. 70 50 29	9893 9654 9578 9641 9617	90 36 45 67 34 32 30 47 59 28 28 10 69 11 57	9909 9668 9599 9652 9633	92 8 52 69 11 55 32 27 5 30 5 54 67 33 47	9927 9681 9605 9665 9650	93 40 37 70 49 0 34 5 53 31 43 21 65 56 0	9942 9694 9618 9677 9667
20	SUN Pollux Regulus JUPITER Antares	W. 101 14 20 W. 78 50 3 W. 42 15 21 W. 39 46 22 E. 57 52 46	9922 9780 9685 9749 9751	102 44 6 80 25 23 43 52 21 41 22 6 56 17 14	9937 9773 9698 9754 9769	104 13 33 82 0 26 45 29 3 42 57 34 54 42 5	9952 9786 9711 9767 9785	105 42 42 83 35 12 47 5 28 44 32 45 53 7 18	9967 9798 9723 9779 9803
21	SUN Pollux Regulus JUPITER Antares $\alpha$ Aquilæ	W. 113 4 2 W. 91 24 57 W. 55 3 27 W. 52 24 38 E. 45 19 2 E. 95 1 34	9136 9862 9785 9640 9691 9609	114 31 28 92 58 5 56 38 15 53 58 14 43 46 32 93 35 27	9149 9873 9795 9852 9909 9819	115 58 38 94 30 58 58 12 49 55 31 35 42 14 25 92 9 32	9163 9884 9807 9862 9929 9923	117 25 32 96 3 37 59 47 8 57 4 42 40 42 43 90 43 50	9175 9896 9818 9874 9948 9923
22	SUN Pollux Regulus	W. 124 36 23 W. 103 43 10 W. 67 35 17	9935 9953 9869	126 1 51 105 14 22 69 8 16	9946 9964 9878	127 27 6 106 45 20 70 41 3	9958 9974 9867	128 52 7 108 16 5 72 13 38	9968 9985 9890

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
9	$\alpha$ Pegasi	W.	50° 57' 5"	9652	52° 34' 50"	9616	54° 13' 23"	9583	55° 52' 41"	9553
	SUN	E.	40 51 51	9607	39 13 5	9591	37 33 58	9577	35 54 31	9564
10	Fomalhaut	W.	79 51 26	9295	81 32 4	9268	83 13 6	9439	84 54 31	9477
	$\alpha$ Pegasi	W.	64 19 8	9499	66 2 11	9401	67 45 45	9380	69 29 49	9261
	SUN	E.	27 33 7	9515	25 52 14	9510	24 11 15	9509	22 30 14	9519
14	SUN	W.	29 36 33	9384	31 20 30	9387	33 4 23	9392	34 48 9	9398
	Regulus	E.	35 17 25	9655	33 25 17	9066	31 33 25	9077	29 41 50	9069
	JUPITER	E.	37 2 48	9100	35 11 48	9111	33 21 5	9122	31 30 40	9136
	Spica	E.	68 48 23	9044	86 55 57	9053	85 3 45	9092	83 11 47	9072
15	SUN	W.	43 24 18	9444	45 6 50	9455	46 49 6	9467	48 31 5	9481
	JUPITER	E.	22 24 18	9294	20 36 26	9249	18 49 11	9278	17 2 40	9214
	Spica	E.	73 56 0	9199	72 5 45	9142	70 15 50	9155	68 26 15	9169
16	SUN	W.	56 56 9	9554	58 36 7	9569	60 15 44	9585	61 55 0	9601
	Pollux	W.	32 36 9	9527	34 16 45	9517	35 57 35	9510	37 38 34	9507
	Spica	E.	59 23 45	9245	57 36 24	9260	55 49 26	9276	54 2 51	9292
	Antares	E.	105 3 1	9290	103 16 47	9305	101 30 55	9320	99 45 24	9335
17	SUN	W.	70 5 40	9686	71 42 39	9703	73 19 15	9790	74 55 28	9738
	Pollux	W.	46 3 36	9592	47 44 18	9530	49 24 50	9538	51 5 10	9548
	Spica	E.	45 16 7	9279	43 32 2	9296	41 48 22	9415	40 5 8	9433
	Antares	E.	91 3 26	9415	89 20 12	9431	87 37 21	9448	85 54 54	9464
18	SUN	W.	82 50 47	9695	84 24 43	9642	85 58 16	9659	87 31 27	9676
	Pollux	W.	59 23 15	9604	61 2 4	9616	62 40 37	9629	64 18 53	9642
	Spica	E.	31 35 31	9598	29 54 57	9548	28 14 51	9569	26 35 13	9591
	Antares	E.	77 28 31	9548	75 48 25	9566	74 8 43	9583	72 29 24	9600
19	SUN	W.	95 12 2	9658	96 43 7	9675	98 13 51	9691	99 44 15	9696
	Pollux	W.	72 25 48	9707	74 2 18	9790	75 38 31	9734	77 14 26	9747
	Regulus	W.	35 44 23	9639	37 22 35	9646	39 0 28	9659	40 38 3	9672
	JUPITER	W.	33 20 32	9659	34 57 26	9703	36 34 2	9716	38 10 21	9729
	Antares	E.	64 18 36	9684	62 41 35	9701	61 4 56	9718	59 28 40	9735
20	SUN	W.	107 11 32	9681	108 40 5	9695	110 8 21	9169	111 36 20	9193
	Pollux	W.	85 9 42	9611	86 43 55	9694	88 17 52	9636	89 51 33	9649
	Regulus	W.	48 41 37	9736	50 17 29	9748	51 53 5	9761	53 28 24	9773
	JUPITER	W.	46 7 40	9792	47 42 19	9805	49 16 41	9817	50 50 47	9826
	Antares	E.	51 32 54	9690	49 58 52	9638	48 25 13	9655	46 51 56	9673
21	SUN	W.	118 52 11	9188	120 18 35	9199	121 44 45	9211	123 10 41	9223
	Pollux	W.	97 36 1	9208	99 8 10	9290	100 40 4	9231	102 11 44	9242
	Regulus	W.	61 21 13	9698	62 55 4	9639	64 28 41	9649	66 2 5	9659
	JUPITER	W.	58 37 34	9685	60 10 12	9695	61 42 37	9205	63 14 50	9215
	Antares	E.	39 11 25	9669	37 40 33	9691	36 10 9	9014	34 40 13	9038
	$\alpha$ Aquilæ	E.	89 18 20	9244	87 53 3	9256	86 28 0	9369	85 3 12	9381
22	SUN	W.	130 16 56	9378	131 41 33	9389	133 5 57	9300	134 30 9	9309
	Pollux	W.	109 46 36	9296	111 16 54	9006	112 46 59	9017	114 16 51	9098
	Regulus	W.	73 46 2	9205	75 18 15	9213	76 50 17	9221	78 22 9	9230

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
22	JUPITER W.	64 46 50	2925	66 18 37	2935	67 50 12	2943	69 21 36	2953
	Antares E.	33 10 47	3064	31 41 53	3091	30 13 33	3123	28 45 51	3157
	α Aquilæ E.	83 38 38	3293	82 14 18	3306	80 50 13	3319	79 26 23	3332
23	Regulus W.	79 53 50	2938	81 25 21	2945	82 56 43	2951	84 27 57	2958
	JUPITER W.	76 55 49	2994	78 26 9	3002	79 56 19	3009	81 26 20	3016
	Spica W.	26 31 1	2979	28 1 40	2989	29 32 15	2995	31 2 46	2999
	α Aquilæ E.	72 31 18	3408	71 9 10	3423	69 47 19	3439	68 25 47	3457
	Fomalhaut E.	104 29 56	3397	103 6 16	3331	101 42 40	3333	100 19 7	3337
24	Regulus W.	92 1 59	2990	93 32 24	2996	95 2 42	3001	96 32 53	3006
	JUPITER W.	88 54 22	3048	90 23 35	3054	91 52 41	3060	93 21 40	3065
	Spica W.	38 34 8	3009	40 4 9	3014	41 34 5	3018	43 3 56	3022
	α Aquilæ E.	61 43 21	3557	60 24 0	3581	59 5 5	3606	57 46 37	3632
	Fomalhaut E.	93 22 26	3357	91 59 20	3369	90 36 20	3367	89 13 26	3372
	α Pegasi E.	108 42 32	3343	107 17 14	3345	105 51 58	3347	104 26 44	3349
25	Regulus W.	104 2 16	3030	105 31 52	3034	107 1 22	3038	108 30 47	3042
	JUPITER W.	100 45 0	3089	102 13 23	3093	103 41 41	3097	105 9 54	3101
	Spica W.	50 31 58	3040	52 1 21	3043	53 30 40	3047	54 59 55	3050
	α Aquilæ E.	51 21 50	3789	50 6 36	3827	48 52 2	3869	47 38 11	3914
	Fomalhaut E.	82 20 35	3404	80 58 23	3411	79 36 19	3418	78 14 23	3426
	α Pegasi E.	97 21 13	3360	95 56 15	3364	94 31 21	3366	93 6 30	3370
26	JUPITER W.	112 29 52	3118	113 57 40	3121	115 25 24	3124	116 53 5	3127
	Spica W.	02 25 14	3064	63 54 8	3065	65 23 0	3068	66 51 49	3070
	Antares W.	18 44 50	3623	20 2 59	3551	21 22 27	3491	22 43 1	3442
	α Aquilæ E.	41 41 28	4204	40 33 6	4280	39 25 55	4364	38 20 1	4457
	Fomalhaut E.	71 27 5	3471	70 6 9	3482	68 45 25	3493	67 24 53	3505
	α Pegasi E.	86 3 13	3267	84 38 46	3291	83 14 24	3294	81 50 6	3299
27	Spica W.	74 15 19	3078	75 43 56	3079	77 12 31	3080	78 41 5	3081
	Antares W.	29 36 51	3297	31 1 6	3279	32 25 42	3294	33 50 36	3250
	Fomalhaut E.	60 45 44	3575	59 26 43	3592	58 8 0	3610	56 49 37	3629
	α Pegasi E.	74 49 52	3391	73 26 5	3397	72 2 25	3392	70 38 51	3398
28	Spica W.	86 3 46	3082	87 32 17	3082	89 0 49	3082	90 29 21	3081
	Antares W.	40 58 32	3201	42 24 40	3194	43 50 56	3188	45 17 20	3181
	Fomalhaut E.	50 23 25	3752	49 7 33	3783	47 52 13	3817	46 37 28	3853
	α Pegasi E.	63 42 50	3372	62 20 2	3380	60 57 23	3389	59 34 54	3399
	α Arietis E.	106 44 21	3123	105 18 3	3191	103 51 43	3189	102 25 21	3187
29	Spica W.	97 52 16	3076	99 20 55	3073	100 49 37	3071	102 18 22	3069
	Antares W.	52 31 8	3153	53 58 13	3148	55 25 24	3143	56 52 41	3138
	Fomalhaut E.	40 34 18	4100	39 24 16	4165	38 15 17	4228	37 7 27	4291
	α Pegasi E.	52 45 26	3457	51 24 14	3471	50 3 18	3488	48 42 41	3506
	α Arietis E.	95 12 55	3177	93 46 18	3175	92 19 39	3173	90 52 57	3171
30	Antares W.	64 10 38	3113	65 38 32	3108	67 6 32	3102	68 34 39	3096
	α Pegasi E.	42 5 11	3696	40 47 5	3659	39 29 34	3685	38 12 42	3736
	α Arietis E.	83 38 45	3157	82 11 44	3154	80 44 40	3152	79 17 33	3149
	Aldebaran E.	116 30 49	3043	115 1 30	3040	113 32 7	3036	112 2 39	3032
	Sun E.	146 43 45	3461	145 22 37	3453	144 1 20	3445	142 39 54	3438

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Dif.	XV <sup>h</sup> .	P. L. of Dif.	XVIII <sup>h</sup> .	P. L. of Dif.	XXI <sup>h</sup> .	P. L. of Dif.
22	JUPITER	W.	70° 52' 48"	9969	72° 23' 49"	9970	73° 54' 39"	9978	75° 25' 19"	9986
	Antares	E.	27 18 50	3194	25 52 34	3238	24 27 10	3968	23 2 44	3345
	α Aquilæ	E.	78 2 49	3346	76 39 31	3361	75 16 30	3375	73 53 45	3391
23	Regulus	W.	85 59 2	9965	87 29 58	9979	89 0 46	9978	90 31 26	9984
	JUPITER	W.	82 56 13	3093	84 25 57	3030	85 55 33	3036	87 25 1	3042
	Spica	W.	32 33 12	9993	34 3 33	9997	35 33 50	3001	37 4 2	3005
	α Aquilæ	E.	67 4 35	3476	65 43 44	3495	64 23 14	3515	63 3 6	3535
	Fomalhaut	E.	98 55 38	3340	97 32 13	3344	96 8 53	3348	94 45 37	3359
24	Regulus	W.	98 2 58	3011	99 32 57	3017	101 2 49	3099	102 32 35	3096
	JUPITER	W.	94 50 32	3070	96 19 18	3075	97 47 58	3060	99 16 32	3065
	Spica	W.	44 33 42	3086	46 3 23	3030	47 32 59	3033	49 2 31	3037
	α Aquilæ	E.	56 28 37	3659	55 11 6	3689	53 54 7	3730	52 37 41	3753
	Fomalhaut	E.	87 50 38	3378	86 27 56	3384	85 5 21	3391	83 42 54	3398
	α Pegasi	E.	103 1 33	3951	101 36 24	3953	100 11 18	3955	98 46 14	3958
25	Regulus	W.	110 0 8	3045	111 29 25	3049	112 58 37	3059	114 27 45	3056
	JUPITER	W.	106 38 2	3105	108 6 6	3109	109 34 5	3119	111 2 0	3114
	Spica	W.	56 29 6	3053	57 58 13	3056	59 27 17	3059	60 56 17	3061
	α Aquilæ	E.	46 25 5	3962	45 12 48	4015	44 1 23	4073	42 50 55	4136
	Fomalhaut	E.	76 52 36	3434	75 30 58	3443	74 9 30	3459	72 48 12	3469
	α Pegasi	E.	91 41 43	3973	90 17 0	3976	88 52 20	3979	87 27 44	3983
26	JUPITER	W.	118 20 42	3199	119 48 16	3131	121 15 48	3133	122 43 18	3134
	Spica	W.	68 20 35	3079	69 49 19	3073	71 18 1	3075	72 46 41	3077
	Antares	W.	24 4 30	3409	25 26 44	3370	26 49 35	3341	28 12 59	3317
	α Aquilæ	E.	37 15 31	4559	36 12 31	4673	35 11 9	4901	34 11 34	4945
	Fomalhaut	E.	66 4 34	3517	64 44 29	3530	63 24 38	3544	62 5 3	3559
	α Pegasi	E.	80 25 53	3303	79 1 45	3307	77 37 42	3319	76 13 44	3317
27	Spica	W.	80 9 38	3081	81 38 11	3089	83 6 43	3089	84 35 15	3089
	Antares	W.	35 15 46	3928	36 41 10	3928	38 6 46	3918	39 32 34	3909
	Fomalhaut	E.	55 31 34	3649	54 13 53	3673	52 56 37	3697	51 39 47	3794
	α Pegasi	E.	69 15 24	3345	67 52 4	3351	66 28 51	3358	65 5 46	3365
28	Spica	W.	91 57 54	3080	93 26 28	3079	94 55 3	3078	96 23 39	3078
	Antares	W.	46 43 52	3175	48 10 31	3169	49 37 17	3164	51 4 9	3158
	Fomalhaut	E.	45 23 20	3893	44 9 53	3937	42 57 11	3966	41 45 18	4040
	α Pegasi	E.	58 12 36	3408	56 50 29	3419	55 28 34	3431	54 6 53	3444
	α Arietis	E.	100 58 56	3185	99 32 29	3183	98 6 0	3189	96 39 29	3179
29	Spica	W.	103 47 9	3067	105 15 59	3065	106 44 52	3069	108 13 48	3060
	Antares	W.	58 20 4	3133	59 47 33	3129	61 15 8	3123	62 42 50	3118
	Fomalhaut	E.	36 0 54	4414	34 55 45	4517	33 52 8	4633	32 50 12	4765
	α Pegasi	E.	47 22 23	3595	46 2 27	3547	44 42 55	3571	43 23 49	3597
	α Arietis	E.	89 26 13	3168	87 59 26	3166	86 32 36	3163	85 5 42	3160
30	Antares	W.	70 2 53	3091	71 31 14	3085	72 59 42	3078	74 28 18	3073
	α Pegasi	E.	36 56 33	3789	35 41 12	3835	34 26 46	3896	33 13 22	3965
	α Arietis	E.	77 50 23	3146	76 23 9	3149	74 55 50	3138	73 28 27	3135
	Aldebaran	E.	110 33 6	3097	109 3 27	3099	107 33 42	3018	106 3 51	3019
	Sun	E.	141 18 20	3430	139 56 37	3423	138 34 46	3415	137 12 46	3408

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Wed.	1	<sup>h</sup> 6 <sup>m</sup> 42 <sup>s</sup> 23.29	10.334	N. 23° 5' 37".8	-10.46	15' 46".18	68.77	<sup>m</sup> 3 <sup>s</sup> 34.05	0.476
Thur.	2	6 46 31.19	10.323	23 1 14.4	11.46	15 46.17	68.73	3 45.36	0.465
Frid.	3	6 50 38.83	10.312	22 56 26.9	12.47	15 46.16	68.69	3 56.41	0.454
Sat.	4	6 54 46.18	10.300	22 51 15.4	-13.47	15 46.16	68.65	4 7.18	0.442
SUN.	5	6 58 53.22	10.287	22 45 40.0	14.46	15 46.17	68.60	4 17.64	0.429
Mon.	6	7 2 59.95	10.273	22 39 40.9	15.45	15 46.18	68.55	4 27.79	0.415
Tues.	7	7 7 6.33	10.258	22 33 18.2	-16.43	15 46.19	68.50	4 37.58	0.400
Wed.	8	7 11 12.35	10.242	22 26 32.1	17.40	15 46.21	68.45	4 47.01	0.384
Thur.	9	7 15 17.98	10.226	22 19 22.7	18.37	15 46.23	68.39	4 56.06	0.368
Frid.	10	7 19 23.21	10.209	22 11 50.1	-19.33	15 46.26	68.33	5 4.71	0.351
Sat.	11	7 23 28.02	10.191	22 3 54.6	20.28	15 46.29	68.27	5 12.95	0.333
SUN.	12	7 27 32.39	10.172	21 55 36.4	21.22	15 46.33	68.21	5 20.74	0.314
Mon.	13	7 31 36.28	10.152	21 46 55.7	-22.15	15 46.38	68.14	5 28.05	0.294
Tues.	14	7 35 39.69	10.132	21 37 52.7	23.08	15 46.43	68.07	5 34.88	0.274
Wed.	15	7 39 42.60	10.111	21 28 27.6	24.00	15 46.49	68.00	5 41.22	0.253
Thur.	16	7 43 44.99	10.089	21 18 40.4	-24.91	15 46.56	67.93	5 47.04	0.231
Frid.	17	7 47 46.85	10.067	21 8 31.6	25.81	15 46.63	67.85	5 52.33	0.209
Sat.	18	7 51 48.17	10.044	20 58 1.3	26.69	15 46.70	67.78	5 57.08	0.186
SUN.	19	7 55 48.93	10.020	20 47 9.8	-27.57	15 46.78	67.70	6 1.27	0.162
Mon.	20	7 59 49.12	9.995	20 35 57.5	28.44	15 46.86	67.62	6 4.89	0.138
Tues.	21	8 3 48.72	9.971	20 24 24.4	29.30	15 46.95	67.54	6 7.93	0.114
Wed.	22	8 7 47.73	9.947	20 12 30.7	-30.15	15 47.04	67.46	6 10.39	0.090
Thur.	23	8 11 46.16	9.922	20 0 16.8	30.99	15 47.13	67.38	6 12.26	0.065
Frid.	24	8 15 44.00	9.898	19 47 42.8	31.82	15 47.23	67.30	6 13.54	0.041
Sat.	25	8 19 41.24	9.873	19 34 49.1	-32.64	15 47.33	67.22	6 14.23	0.016
SUN.	26	8 23 37.87	9.848	19 21 35.8	33.45	15 47.43	67.14	6 14.31	0.009
Mon.	27	8 27 33.91	9.823	19 8 3.3	34.25	15 47.54	67.05	6 13.78	0.034
Tues.	28	8 31 29.36	9.798	18 54 11.8	-35.04	15 47.65	66.97	6 12.67	0.059
Wed.	29	8 35 24.21	9.773	18 40 1.6	35.81	15 47.76	66.88	6 10.97	0.084
Thur.	30	8 39 18.46	9.748	18 25 33.0	36.57	15 47.87	66.79	6 8.68	0.109
Frid.	31	8 43 12.12	9.724	18 10 46.2	37.32	15 47.99	66.70	6 5.79	0.134
Sat.	32	8 47 5.19	9.699	N. 17 55 41.6	-38.06	15 48.11	66.62	6 2.31	0.158

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sideral time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Wed.	1	6 <sup>h</sup> 42 <sup>m</sup> 22.67 <sup>s</sup>	10.333	N. 23° 5' 38.4"	-10.46	3 <sup>m</sup> 34.02 <sup>s</sup>	0.476	6 <sup>h</sup> 38 <sup>m</sup> 48.65 <sup>s</sup>
Thur.	2	6 46 30.54	10.322	23 1 15.1	11.46	3 45.33	0.465	6 42 45.21
Frid.	3	6 50 38.15	10.311	22 56 27.7	12.47	3 56.38	0.454	6 46 41.77
Sat.	4	6 54 45.47	10.299	22 51 16.3	-13.47	4 7.15	0.442	6 50 38.32
SUN.	5	6 58 52.48	10.286	22 45 41.1	14.46	4 17.61	0.429	6 54 34.87
Mon.	6	7 2 59.18	10.272	22 39 42.1	15.45	4 27.75	0.415	6 58 31.43
Tues.	7	7 7 5.54	10.257	22 33 19.5	-16.43	4 37.55	0.400	7 2 27.99
Wed.	8	7 11 11.53	10.241	22 26 33.5	17.40	4 46.98	0.384	7 6 24.55
Thur.	9	7 15 17.13	10.225	22 19 24.2	18.37	4 56.03	0.368	7 10 21.10
Frid.	10	7 19 22.34	10.208	22 11 51.8	-19.33	5 4.68	0.351	7 14 17.66
Sat.	11	7 23 27.13	10.190	22 3 56.5	20.28	5 12.92	0.333	7 18 14.21
SUN.	12	7 27 31.48	10.171	21 55 38.3	21.22	5 20.71	0.314	7 22 10.77
Mon.	13	7 31 35.35	10.151	21 46 57.7	-22.15	5 28.02	0.294	7 26 7.33
Tues.	14	7 35 38.74	10.131	21 37 54.9	23.08	5 34.85	0.274	7 30 3.89
Wed.	15	7 39 41.64	10.110	21 28 29.9	24.00	5 41.20	0.253	7 34 0.44
Thur.	16	7 43 44.02	10.088	21 18 42.9	-24.91	5 47.02	0.231	7 37 57.00
Frid.	17	7 47 45.86	10.066	21 8 34.2	25.81	5 52.31	0.209	7 41 53.55
Sat.	18	7 51 47.17	10.043	20 58 4.0	26.69	5 57.06	0.186	7 45 50.11
SUN.	19	7 55 47.93	10.019	20 47 12.6	-27.58	6 1.26	0.162	7 49 46.67
Mon.	20	7 59 48.10	9.995	20 36 0.4	28.44	6 4.88	0.138	7 53 43.22
Tues.	21	8 3 47.69	9.971	20 24 27.4	29.30	6 7.92	0.114	7 57 39.77
Wed.	22	8 7 46.70	9.947	20 12 33.8	-30.15	6 10.37	0.090	8 1 36.33
Thur.	23	8 11 45.13	9.922	20 0 20.0	30.99	6 12.25	0.065	8 5 32.88
Frid.	24	8 15 42.97	9.898	19 47 46.1	31.82	6 13.53	0.041	8 9 29.44
Sat.	25	8 19 40.21	9.873	19 34 52.5	-32.64	6 14.22	0.016	8 13 25.99
SUN.	26	8 23 36.85	9.848	19 21 39.3	33.45	6 14.30	0.009	8 17 22.55
Mon.	27	8 27 32.89	9.823	19 8 6.9	34.25	6 13.78	0.034	8 21 19.11
Tues.	28	8 31 28.34	9.798	18 54 15.5	-35.04	6 12.67	0.059	8 25 15.67
Wed.	29	8 35 23.20	9.773	18 40 5.4	35.80	6 10.97	0.084	8 29 12.23
Thur.	30	8 39 17.46	9.748	18 25 36.9	36.57	6 8.68	0.109	8 33 8.78
Frid.	31	8 43 11.13	9.724	18 10 50.1	37.32	6 5.80	0.134	8 37 5.33
Sat.	32	8 47 4.21	9.699	N. 17 55 45.5	-38.06	6 2.32	0.158	8 41 1.89

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+ 9".8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	182	99° 44' 32.5	44' 7.3	142.96	+ 0.61	0.0072056	+ 1.9	17 <sup>h</sup> 18 <sup>m</sup> 20.77 <sup>s</sup>
2	183	100 41 43.6	41 18.2	142.97	0.49	0.0072093	1.2	17 14 24.86
3	184	101 38 55.0	38 29.3	142.98	0.36	0.0072113	+ 0.4	17 10 28.95
4	185	102 36 6.6	35 40.8	142.99	+ 0.22	0.0072113	- 0.4	17 6 33.04
5	186	103 33 18.6	32 52.7	143.01	+ 0.09	0.0072093	1.3	17 2 37.13
6	187	104 30 31.0	30 5.0	143.02	- 0.02	0.0072052	2.2	16 58 41.22
7	188	105 27 43.6	27 17.6	143.04	- 0.11	0.0071989	- 3.1	16 54 45.31
8	189	106 24 56.9	24 30.5	143.05	0.19	0.0071903	4.1	16 50 49.40
9	190	107 22 10.4	21 43.8	143.07	0.24	0.0071791	5.1	16 46 53.49
10	191	108 19 24.3	18 57.6	143.08	- 0.25	0.0071653	- 6.2	16 42 57.58
11	192	109 16 38.6	16 11.8	143.10	0.25	0.0071490	7.3	16 39 1.67
12	193	110 13 53.2	13 26.3	143.11	0.20	0.0071301	8.4	16 35 5.76
13	194	111 11 8.2	10 41.0	143.13	- 0.14	0.0071086	- 9.5	16 31 9.85
14	195	112 8 23.4	7 56.0	143.14	- 0.03	0.0070844	10.6	16 27 13.94
15	196	113 5 38.8	5 11.2	143.15	+ 0.07	0.0070577	11.6	16 23 18.03
16	197	114 2 54.5	2 26.7	143.16	+ 0.19	0.0070285	- 12.6	16 19 22.12
17	198	114 60 10.4	59 42.5	143.17	0.32	0.0069969	13.6	16 15 26.21
18	199	115 57 26.5	56 58.5	143.18	0.45	0.0069631	14.5	16 11 30.30
19	200	116 54 42.9	54 14.7	143.19	+ 0.58	0.0069271	- 15.4	16 7 34.38
20	201	117 51 59.5	51 31.2	143.20	0.68	0.0068891	16.2	16 3 38.47
21	202	118 49 16.4	48 48.0	143.21	0.78	0.0068492	17.0	15 59 42.56
22	203	119 46 33.7	46 5.1	143.22	+ 0.85	0.0068076	- 17.7	15 55 46.66
23	204	120 43 51.4	43 22.7	143.24	0.88	0.0067645	18.3	15 51 50.75
24	205	121 41 9.5	40 40.7	143.26	0.88	0.0067199	18.9	15 47 54.84
25	206	122 38 28.2	37 59.2	143.29	+ 0.85	0.0066738	- 19.5	15 43 58.93
26	207	123 35 47.5	35 18.3	143.32	0.80	0.0066263	20.0	15 40 8.02
27	208	124 33 7.6	32 38.3	143.35	0.73	0.0065776	20.5	15 36 7.11
28	209	125 30 28.5	29 59.1	143.38	+ 0.62	0.0065277	- 21.0	15 32 11.20
29	210	126 27 50.3	27 20.8	143.42	0.49	0.0064765	21.6	15 28 15.29
30	211	127 25 13.0	24 43.3	143.46	0.36	0.0064240	22.2	15 24 19.38
31	212	128 22 36.7	22 6.9	143.51	0.22	0.0063700	22.8	15 20 23.47
32	213	129 20 1.6	19 31.7	143.56	+ 0.09	0.0063145	- 23.4	15 16 27.56
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> 0 <sup>m</sup> 0 <sup>s</sup> .								
								Diff. for 1 Hour, — 9 <sup>s</sup> . 8296. (Table II.)

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	14' 52.5	14' 55.5	54' 28.5	+ 0.85	54' 39.7	+ 1.01	<sup>h</sup> 15 <sup>m</sup> 29.8	<sup>m</sup> 1.85	<sup>d</sup> 18.6
2	14 59.1	15 3.1	54 52.7	1.16	55 7.6	1.32	16 14.1	1.85	19.6
3	15 7.7	15 12.9	55 24.5	1.49	55 43.4	1.65	16 58.8	1.88	20.6
4	15 18.5	15 24.7	56 4.1	+ 1.80	56 26.7	+ 1.95	17 44.7	1.94	21.6
5	15 31.2	15 38.2	56 50.9	2.07	57 16.5	2.18	18 32.4	2.04	22.6
6	15 45.5	15 53.0	57 43.3	2.27	58 10.9	2.31	19 22.9	2.17	23.6
7	16 0.6	16 8.1	58 38.8	+ 2.32	59 6.4	+ 2.27	20 16.8	2.33	24.6
8	16 15.2	16 22.3	59 33.2	2.17	59 58.5	2.02	21 14.4	2.47	25.6
9	16 28.6	16 34.2	60 21.7	1.81	60 42.0	1.55	22 15.1	2.58	26.6
10	16 38.7	16 42.2	60 58.8	+ 1.22	61 11.4	+ 0.86	23 17.6	2.62	27.6
11	16 44.4	16 45.2	61 19.4	+ 0.47	61 22.6	+ 0.05	δ		28.6
12	16 44.7	16 42.8	61 20.7	- 0.36	61 13.8	- 0.77	0 20.0	2.57	0.3
13	16 39.7	16 35.3	61 2.2	- 1.14	60 46.3	- 1.48	1 20.6	2.46	1.3
14	16 30.0	16 23.7	60 26.5	1.78	60 3.6	2.01	2 18.2	2.33	2.3
15	16 16.8	16 9.4	59 38.3	2.18	59 11.2	2.30	3 12.6	2.20	3.3
16	16 1.8	15 54.0	58 43.1	- 2.36	58 14.6	- 2.36	4 4.1	2.09	4.3
17	15 46.3	15 38.8	57 46.3	2.33	57 18.7	2.26	4 53.4	2.02	5.3
18	15 31.6	15 24.7	56 52.1	2.16	56 27.0	2.02	5 41.2	1.97	6.3
19	15 18.4	15 12.5	56 3.6	- 1.87	55 42.1	- 1.71	6 28.2	1.95	7.3
20	15 7.2	15 2.5	55 22.6	1.54	55 5.2	1.36	7 15.1	1.95	8.3
21	14 58.3	14 54.7	54 50.0	1.18	54 36.8	1.01	8 2.1	1.96	9.3
22	14 51.7	14 49.2	54 25.7	- 0.84	54 16.6	- 0.67	8 49.3	1.97	10.3
23	14 47.3	14 45.9	54 9.5	0.52	54 4.2	0.37	9 36.7	1.98	11.3
24	14 44.9	14 44.4	54 0.6	- 0.23	53 58.7	- 0.10	10 24.2	1.97	12.3
25	14 44.3	14 44.5	53 58.3	+ 0.02	53 59.3	+ 0.14	11 11.3	1.95	13.3
26	14 45.2	14 46.2	54 1.8	0.26	54 5.5	0.37	11 57.8	1.92	14.3
27	14 47.6	14 49.3	54 10.6	0.47	54 16.9	0.57	12 43.5	1.89	15.3
28	14 51.4	14 53.8	54 24.5	+ 0.68	54 33.3	+ 0.78	13 28.5	1.86	16.3
29	14 56.5	14 59.6	54 43.3	0.88	54 54.6	1.00	14 13.1	1.85	17.3
30	15 3.0	15 6.8	55 7.2	1.11	55 21.1	1.22	14 57.6	1.86	18.3
31	15 11.0	15 15.5	55 36.4	1.33	55 53.0	1.44	15 42.6	1.90	19.3
32	15 20.4	15 25.7	56 11.0	+ 1.56	56 30.4	+ 1.67	16 28.9	1.96	20.3

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 1.					FRIDAY 3.				
0	<sup>h</sup> 21 <sup>m</sup> 40 <sup>s</sup> 40.39	1.9682	S. 10° 51' 49.1"	7.758	0	<sup>h</sup> 23 <sup>m</sup> 14 <sup>s</sup> 45.10	1.9650	S. 3° 51' 26.2"	9.564
1	21 42 38.45	1.9674	10 44 2.5	7.801	1	23 16 43.08	1.9668	3 41 51.6	9.588
2	21 44 36.47	1.9666	10 36 13.0	7.850	2	23 18 41.12	1.9678	3 32 15.6	9.619
3	21 46 34.44	1.9658	10 28 20.5	7.899	3	23 20 39.22	1.9688	3 22 38.2	9.635
4	21 48 32.36	1.9650	10 20 25.1	7.948	4	23 22 37.38	1.9698	3 12 59.4	9.657
5	21 50 30.24	1.9643	10 12 26.8	7.996	5	23 24 35.60	1.9709	3 3 19.3	9.680
6	21 52 28.08	1.9636	10 4 25.6	8.043	6	23 26 33.89	1.9721	2 53 37.8	9.702
7	21 54 25.87	1.9629	9 56 21.6	8.090	7	23 28 32.25	1.9733	2 43 55.1	9.723
8	21 56 23.63	1.9623	9 48 14.8	8.136	8	23 30 30.69	1.9746	2 34 11.1	9.743
9	21 58 21.35	1.9617	9 40 5.3	8.182	9	23 32 29.21	1.9760	2 24 25.9	9.762
10	22 0 19.03	1.9611	9 31 53.0	8.227	10	23 34 27.81	1.9773	2 14 39.6	9.782
11	22 2 16.68	1.9606	9 23 38.0	8.272	11	23 36 26.49	1.9787	2 4 52.1	9.801
12	22 4 14.30	1.9601	9 15 20.4	8.316	12	23 38 25.26	1.9802	1 55 3.5	9.818
13	22 6 11.89	1.9596	9 7 0.1	8.360	13	23 40 24.12	1.9817	1 45 13.9	9.836
14	22 8 9.45	1.9591	8 58 37.2	8.403	14	23 42 23.07	1.9832	1 35 23.2	9.853
15	22 10 6.98	1.9587	8 50 11.7	8.446	15	23 44 22.11	1.9848	1 25 31.5	9.869
16	22 12 4.49	1.9583	8 41 43.7	8.488	16	23 46 21.25	1.9865	1 15 38.9	9.884
17	22 14 1.98	1.9580	8 33 13.2	8.530	17	23 48 20.49	1.9882	1 5 45.4	9.899
18	22 15 59.45	1.9577	8 24 40.1	8.572	18	23 50 19.84	1.9900	0 55 51.0	9.914
19	22 17 56.90	1.9573	8 16 4.6	8.612	19	23 52 19.29	1.9918	0 45 55.7	9.927
20	22 19 54.33	1.9571	8 7 26.7	8.652	20	23 54 18.85	1.9937	0 35 59.7	9.940
21	22 21 51.75	1.9569	7 58 46.4	8.692	21	23 56 18.53	1.9957	0 26 2.9	9.952
22	22 23 49.15	1.9567	7 50 3.7	8.731	22	23 58 18.33	1.9977	0 16 5.4	9.964
23	22 25 46.55	1.9566	S. 7 41 18.7	8.770	23	0 0 18.25	1.9997	S. 0 6 7.2	9.975
THURSDAY 2.					SATURDAY 4.				
0	22 27 43.94	1.9564	S. 7 32 31.3	8.808	0	0 2 18.29	2.0017	N. 0 3 51.6	9.985
1	22 29 41.32	1.9563	7 23 41.7	8.845	1	0 4 18.45	2.0038	0 13 51.0	9.995
2	22 31 38.70	1.9563	7 14 49.9	8.883	2	0 6 18.74	2.0060	0 23 51.0	10.004
3	22 33 36.08	1.9563	7 5 55.8	8.920	3	0 8 19.17	2.0082	0 33 51.5	10.012
4	22 35 33.46	1.9564	6 56 59.5	8.956	4	0 10 19.73	2.0105	0 43 52.5	10.020
5	22 37 30.85	1.9565	6 48 1.1	8.991	5	0 12 20.43	2.0128	0 53 53.9	10.027
6	22 39 28.24	1.9566	6 39 0.6	9.026	6	0 14 21.27	2.0152	1 3 55.8	10.034
7	22 41 25.64	1.9567	6 29 58.0	9.061	7	0 16 22.25	2.0176	1 13 58.0	10.039
8	22 43 23.05	1.9569	6 20 53.3	9.095	8	0 18 23.38	2.0202	1 24 0.5	10.044
9	22 45 20.47	1.9572	6 11 46.6	9.129	9	0 20 24.67	2.0227	1 34 3.3	10.048
10	22 47 17.91	1.9575	6 2 37.9	9.161	10	0 22 26.11	2.0253	1 44 6.3	10.052
11	22 49 15.37	1.9578	5 53 27.3	9.193	11	0 24 27.71	2.0280	1 54 9.5	10.054
12	22 51 12.85	1.9582	5 44 14.8	9.224	12	0 26 29.47	2.0307	2 4 12.8	10.056
13	22 53 10.35	1.9586	5 35 0.4	9.256	13	0 28 31.39	2.0334	2 14 16.2	10.057
14	22 55 7.88	1.9590	5 25 44.1	9.287	14	0 30 33.48	2.0363	2 24 19.7	10.058
15	22 57 5.43	1.9594	5 16 26.0	9.317	15	0 32 35.74	2.0392	2 34 23.2	10.057
16	22 59 3.01	1.9600	5 7 6.1	9.347	16	0 34 38.18	2.0421	2 44 26.6	10.056
17	23 1 0.63	1.9606	4 57 44.4	9.376	17	0 36 40.79	2.0450	2 54 29.9	10.055
18	23 2 58.28	1.9612	4 48 21.0	9.404	18	0 38 43.58	2.0481	3 4 33.2	10.053
19	23 4 55.97	1.9619	4 38 55.9	9.432	19	0 40 46.56	2.0512	3 14 36.3	10.049
20	23 6 53.70	1.9626	4 29 29.2	9.459	20	0 42 49.72	2.0543	3 24 39.1	10.045
21	23 8 51.48	1.9633	4 20 0.8	9.486	21	0 44 53.07	2.0575	3 34 41.7	10.041
22	23 10 49.30	1.9641	4 10 30.8	9.512	22	0 46 56.62	2.0607	3 44 44.0	10.035
23	23 12 47.17	1.9650	4 0 59.3	9.538	23	0 49 0.36	2.0640	3 54 45.9	10.028
24	23 14 45.10	1.9659	S. 3 51 26.2	9.564	24	0 51 4.30	2.0673	N. 4 4 47.4	10.021

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 5.					TUESDAY 7.				
0	h m s		N. ° ' "		0	h m s		N. ° ' "	
0	51 4.30	2.0673	4 4 47.4	10.031	0	2 35 7.65	2.3856	11 40 18.3	8.573
1	0 53 8.44	2.0707	4 14 48.5	10.013	1	2 37 24.95	2.3911	11 48 51.0	8.517
2	0 55 12.79	2.0742	4 24 49.0	10.004	2	2 39 42.58	2.3966	11 57 20.3	8.459
3	0 57 17.35	2.0777	4 34 49.0	9.985	3	2 42 0.54	2.3993	12 5 46.1	8.400
4	0 59 22.12	2.0813	4 44 48.4	9.964	4	2 44 18.84	2.3977	12 14 8.3	8.340
5	1 1 27.11	2.0850	4 54 47.1	9.973	5	2 46 37.47	2.3139	12 22 26.9	8.279
6	1 3 32.32	2.0887	5 4 45.1	9.960	6	2 48 56.43	2.3188	12 30 41.8	8.217
7	1 5 37.75	2.0923	5 14 42.3	9.947	7	2 51 15.73	2.3245	12 38 52.9	8.153
8	1 7 43.40	2.0961	5 24 38.7	9.933	8	2 53 35.37	2.3303	12 47 0.2	8.088
9	1 9 49.28	2.0999	5 34 34.3	9.918	9	2 55 55.35	2.3368	12 55 3.5	8.022
10	1 11 55.39	2.1038	5 44 28.9	9.903	10	2 58 15.67	2.3415	13 3 2.8	7.955
11	1 14 1.74	2.1078	5 54 22.6	9.887	11	3 0 36.33	2.3479	13 10 58.1	7.887
12	1 16 8.33	2.1118	6 4 15.3	9.889	12	3 2 57.34	2.3530	13 18 49.2	7.816
13	1 18 15.16	2.1158	6 14 6.9	9.851	13	3 5 18.69	2.3587	13 26 36.0	7.745
14	1 20 22.23	2.1198	6 23 57.4	9.832	14	3 7 40.38	2.3643	13 34 18.6	7.673
15	1 22 29.54	2.1239	6 33 46.7	9.812	15	3 10 2.41	2.3700	13 41 56.8	7.600
16	1 24 37.10	2.1280	6 43 34.8	9.790	16	3 12 24.78	2.3757	13 49 30.6	7.525
17	1 26 44.92	2.1325	6 53 21.5	9.767	17	3 14 47.50	2.3815	13 56 59.8	7.448
18	1 28 53.00	2.1367	7 3 6.8	9.743	18	3 17 10.56	2.3879	14 4 24.4	7.371
19	1 31 1.33	2.1410	7 12 50.7	9.720	19	3 19 33.96	2.3939	14 11 44.3	7.292
20	1 33 9.92	2.1454	7 22 33.2	9.696	20	3 21 57.71	2.3998	14 18 59.5	7.212
21	1 35 18.78	2.1498	7 32 14.2	9.670	21	3 24 21.80	2.4043	14 26 9.8	7.131
22	1 37 27.90	2.1543	7 41 53.6	9.643	22	3 26 46.23	2.4101	14 33 15.2	7.049
23	1 39 37.30	2.1589	N. 7 51 31.3	9.615	23	3 29 11.01	2.4158	N. 14 40 15.7	6.966
MONDAY 6.					WEDNESDAY 8.				
0	1 41 46.97	2.1635	N. 8 1 7.4	9.587	0	3 31 36.13	2.4215	N. 14 47 11.1	6.880
1	1 43 56.92	2.1682	8 10 41.7	9.556	1	3 34 1.59	2.4279	14 54 1.3	6.794
2	1 46 7.15	2.1738	8 20 14.1	9.525	2	3 36 27.39	2.4328	15 0 46.4	6.707
3	1 48 17.66	2.1775	8 29 44.7	9.493	3	3 38 53.53	2.4384	15 7 26.2	6.618
4	1 50 28.45	2.1823	8 39 13.3	9.460	4	3 41 20.00	2.4440	15 14 0.6	6.528
5	1 52 39.52	2.1869	8 48 39.9	9.427	5	3 43 46.81	2.4497	15 20 29.6	6.437
6	1 54 50.88	2.1918	8 58 4.5	9.393	6	3 46 13.96	2.4553	15 26 53.0	6.344
7	1 57 2.54	2.1967	9 7 27.0	9.356	7	3 48 41.44	2.4608	15 33 10.9	6.251
8	1 59 14.49	2.2017	9 16 47.2	9.318	8	3 51 9.25	2.4663	15 39 23.1	6.156
9	2 1 26.74	2.2067	9 26 5.1	9.279	9	3 53 37.40	2.4718	15 45 29.6	6.060
10	2 3 39.29	2.2117	9 35 20.7	9.241	10	3 56 5.87	2.4773	15 51 30.3	5.963
11	2 5 52.14	2.2167	9 44 34.0	9.201	11	3 58 34.67	2.4827	15 57 25.1	5.863
12	2 8 5.29	2.2217	9 53 44.8	9.159	12	4 1 3.79	2.4881	16 3 13.9	5.763
13	2 10 18.75	2.2269	10 2 53.1	9.117	13	4 3 33.24	2.4935	16 8 56.7	5.660
14	2 12 32.52	2.2321	10 11 58.8	9.073	14	4 6 3.01	2.4988	16 14 33.4	5.560
15	2 14 46.60	2.2373	10 21 1.8	9.028	15	4 8 33.09	2.5040	16 20 3.9	5.456
16	2 17 1.00	2.2426	10 30 2.1	8.983	16	4 11 3.49	2.5092	16 25 28.1	5.352
17	2 19 15.71	2.2478	10 38 59.6	8.935	17	4 13 34.20	2.5145	16 30 46.1	5.247
18	2 21 30.73	2.2530	10 47 54.3	8.887	18	4 16 5.23	2.5197	16 35 57.7	5.139
19	2 23 46.07	2.2584	10 56 46.0	8.837	19	4 18 36.56	2.5247	16 41 2.8	5.031
20	2 26 1.74	2.2638	11 5 34.7	8.787	20	4 21 8.19	2.5297	16 46 1.4	4.923
21	2 28 17.73	2.2692	11 14 20.4	8.735	21	4 23 40.12	2.5347	16 50 53.4	4.813
22	2 30 34.04	2.2746	11 23 2.9	8.682	22	4 26 12.35	2.5396	16 55 38.8	4.700
23	2 32 50.68	2.2801	11 31 42.2	8.628	23	4 28 44.87	2.5445	17 0 17.4	4.587
24	2 35 7.65	2.2856	N. 11 40 18.3	8.573	24	4 31 17.69	2.5493	N. 17 4 49.2	4.473

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 9.					SATURDAY 11.				
0	4 31 17.69	2.5493	N.17° 4' 49".2	4.473	0	6 37 32.70	2.6705	N.18° 12' 31".9	1.853
1	4 33 50.79	2.5540	17 9 14.2	4.359	1	6 40 12.92	2.6709	18 10 36.5	1.999
2	4 36 24.17	2.5587	17 13 32.3	4.943	2	6 42 53.13	2.6699	18 8 32.8	2.130
3	4 38 57.83	2.5633	17 17 43.3	4.195	3	6 45 33.31	2.6694	18 6 20.9	2.268
4	4 41 31.77	2.5678	17 21 47.3	4.007	4	6 48 13.45	2.6698	18 4 0.7	2.406
5	4 44 5.97	2.5722	17 25 44.2	3.888	5	6 50 53.56	2.6681	18 1 32.2	2.543
6	4 46 40.44	2.5767	17 29 33.9	3.768	6	6 53 33.62	2.6679	17 58 55.5	2.680
7	4 49 15.17	2.5811	17 33 16.4	3.647	7	6 56 13.62	2.6669	17 56 10.6	2.817
8	4 51 50.16	2.5856	17 36 51.6	3.526	8	6 58 53.56	2.6651	17 53 17.5	2.953
9	4 54 25.40	2.5893	17 40 19.5	3.403	9	7 1 33.43	2.6638	17 50 16.3	3.088
10	4 57 0.88	2.5934	17 43 40.0	3.279	10	7 4 13.22	2.6625	17 47 7.0	3.223
11	4 59 36.61	2.5974	17 46 53.0	3.154	11	7 6 52.93	2.6610	17 43 49.6	3.358
12	5 2 12.57	2.6013	17 49 58.4	3.028	12	7 9 32.54	2.6594	17 40 24.1	3.498
13	5 4 48.76	2.6051	17 52 56.3	2.903	13	7 12 12.06	2.6578	17 36 50.6	3.625
14	5 7 25.18	2.6088	17 55 46.6	2.775	14	7 14 51.48	2.6560	17 33 9.1	3.757
15	5 10 1.82	2.6124	17 58 29.3	2.647	15	7 17 30.78	2.6540	17 29 19.7	3.889
16	5 12 38.67	2.6159	18 1 4.3	2.518	16	7 20 9.96	2.6520	17 25 22.4	4.021
17	5 15 15.73	2.6193	18 3 31.5	2.388	17	7 22 49.02	2.6500	17 21 17.2	4.159
18	5 17 52.99	2.6227	18 5 50.9	2.257	18	7 25 27.96	2.6478	17 17 4.2	4.281
19	5 20 30.45	2.6260	18 8 2.4	2.127	19	7 28 6.76	2.6454	17 12 43.5	4.410
20	5 23 8.10	2.6290	18 10 6.1	1.996	20	7 30 45.41	2.6429	17 8 15.0	4.538
21	5 25 45.93	2.6320	18 12 1.9	1.863	21	7 33 23.91	2.6404	17 3 38.9	4.666
22	5 28 23.94	2.6350	18 13 49.7	1.730	22	7 36 2.26	2.6378	16 58 55.1	4.799
23	5 31 2.13	2.6378	N.18 15 29.5	1.596	23	7 38 40.45	2.6351	N.16 54 3.8	4.917
FRIDAY 10.					SUNDAY 12.				
0	5 33 40.48	2.6406	N.18 17 1.2	1.462	0	7 41 18.47	2.6322	N.16 49 5.0	5.042
1	5 36 18.99	2.6431	18 18 24.9	1.327	1	7 43 56.31	2.6293	16 43 58.8	5.166
2	5 38 57.65	2.6456	18 19 40.5	1.192	2	7 46 33.98	2.6263	16 38 45.1	5.289
3	5 41 36.46	2.6480	18 20 47.9	1.056	3	7 49 11.47	2.6238	16 33 24.1	5.410
4	5 44 15.41	2.6502	18 21 47.2	0.920	4	7 51 48.77	2.6209	16 27 55.9	5.531
5	5 46 54.49	2.6523	18 22 38.3	0.783	5	7 54 25.87	2.6167	16 22 20.4	5.651
6	5 49 33.69	2.6543	18 23 21.2	0.647	6	7 57 2.77	2.6133	16 16 37.8	5.769
7	5 52 13.01	2.6562	18 23 55.9	0.509	7	7 59 39.46	2.6098	16 10 48.1	5.887
8	5 54 52.44	2.6581	18 24 22.3	0.371	8	8 2 15.95	2.6064	16 4 51.4	6.003
9	5 57 31.98	2.6598	18 24 40.4	0.233	9	8 4 52.23	2.6028	15 58 47.8	6.118
10	6 0 11.62	2.6613	18 24 50.3	+ 0.095	10	8 7 28.29	2.5991	15 52 37.3	6.232
11	6 2 51.34	2.6628	18 24 51.8	- 0.044	11	8 10 4.12	2.5953	15 46 20.0	6.344
12	6 5 31.15	2.6642	18 24 45.0	0.183	12	8 12 39.72	2.5914	15 39 56.0	6.456
13	6 8 11.04	2.6654	18 24 29.9	0.322	13	8 15 15.09	2.5875	15 33 25.3	6.567
14	6 10 51.00	2.6665	18 24 6.4	0.461	14	8 17 50.22	2.5836	15 26 48.0	6.678
15	6 13 31.02	2.6674	18 23 34.6	0.600	15	8 20 25.12	2.5796	15 20 4.2	6.783
16	6 16 11.09	2.6682	18 22 54.4	0.740	16	8 22 59.77	2.5754	15 13 14.0	6.890
17	6 18 51.20	2.6689	18 22 5.8	0.879	17	8 25 34.16	2.5711	15 6 17.4	6.996
18	6 21 31.35	2.6695	18 21 8.9	1.018	18	8 28 8.30	2.5669	14 59 14.5	7.100
19	6 24 11.54	2.6700	18 20 3.6	1.157	19	8 30 42.19	2.5626	14 52 5.4	7.208
20	6 26 51.75	2.6703	18 18 50.0	1.297	20	8 33 15.81	2.5582	14 44 50.2	7.303
21	6 29 31.98	2.6706	18 17 28.0	1.437	21	8 35 49.17	2.5538	14 37 29.0	7.403
22	6 32 12.22	2.6707	18 15 57.6	1.576	22	8 38 22.27	2.5494	14 30 1.8	7.502
23	6 34 52.46	2.6707	18 14 18.9	1.714	23	8 40 55.10	2.5448	14 22 28.7	7.599
24	6 37 32.70	2.6705	N.18 12 31.9	1.853	24	8 43 27.65	2.5403	N.14 14 49.9	7.694

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 13.					WEDNESDAY 15.				
0	8 43 27.65	2.5403	N. 14° 14' 49.9"	7.004	0	10 39 43.03	2.3037	N. 6° 42' 31.3"	10.503
1	8 45 59.93	2.5357	14 7 5.4	7.789	1	10 42 1.11	2.3090	6 31 54.9	10.619
2	8 48 31.93	2.5310	13 59 15.2	7.883	2	10 44 18.91	2.3044	6 21 17.0	10.643
3	8 51 3.65	2.5263	13 51 19.4	7.975	3	10 46 36.44	2.3000	6 10 37.8	10.665
4	8 53 35.09	2.5216	13 43 18.2	8.065	4	10 48 53.69	2.2952	5 59 57.2	10.687
5	8 56 6.24	2.5169	13 35 11.6	8.154	5	10 51 10.67	2.2907	5 49 15.3	10.708
6	8 58 37.11	2.5121	13 26 59.7	8.243	6	10 53 27.38	2.2869	5 38 32.2	10.727
7	9 1 7.69	2.5073	13 18 42.6	8.338	7	10 55 43.82	2.2718	5 27 48.0	10.745
8	9 3 37.98	2.5023	13 10 20.4	8.419	8	10 58 0.00	2.2675	5 17 2.8	10.769
9	9 6 7.97	2.4974	13 1 53.2	8.494	9	11 0 15.92	2.2639	5 6 16.6	10.777
10	9 8 37.67	2.4925	12 53 21.1	8.576	10	11 2 31.58	2.2588	4 55 20.5	10.799
11	9 11 7.07	2.4876	12 44 44.1	8.657	11	11 4 46.98	2.2546	4 44 41.6	10.805
12	9 13 36.18	2.4827	12 36 2.3	8.736	12	11 7 2.13	2.2504	4 33 52.9	10.817
13	9 16 4.99	2.4777	12 27 15.8	8.819	13	11 9 17.02	2.2469	4 23 3.6	10.827
14	9 18 33.50	2.4727	12 18 24.8	8.897	14	11 11 31.67	2.2421	4 12 13.7	10.837
15	9 21 1.71	2.4676	12 9 29.3	8.980	15	11 13 46.07	2.2379	4 1 23.2	10.845
16	9 23 29.61	2.4625	12 0 29.4	9.035	16	11 16 0.22	2.2336	3 50 32.3	10.859
17	9 25 57.21	2.4575	11 51 25.1	9.107	17	11 18 14.13	2.2298	3 39 41.0	10.868
18	9 28 24.51	2.4524	11 42 16.6	9.176	18	11 20 27.80	2.2258	3 28 49.3	10.883
19	9 30 51.50	2.4473	11 33 4.0	9.244	19	11 22 41.23	2.2219	3 17 57.4	10.897
20	9 33 18.19	2.4423	11 23 47.3	9.319	20	11 24 54.43	2.2181	3 7 5.3	10.870
21	9 35 44.58	2.4372	11 14 26.6	9.377	21	11 27 7.40	2.2143	2 56 13.0	10.879
22	9 38 10.66	2.4322	11 5 2.1	9.440	22	11 29 20.14	2.2105	2 45 20.7	10.879
23	9 40 36.44	2.4271	N. 10° 55' 33.8"	9.502	23	11 31 32.66	2.2067	N. 2° 34' 28.4"	10.871
TUESDAY 14.					THURSDAY 16.				
0	9 43 1.91	2.4219	N. 10° 46' 1.8"	9.563	0	11 33 44.95	2.2029	N. 2° 23' 36.2"	10.869
1	9 45 27.07	2.4168	10 36 26.2	9.623	1	11 35 57.02	2.1983	2 12 44.2	10.866
2	9 47 51.93	2.4118	10 26 47.1	9.681	2	11 38 8.87	2.1937	2 1 52.3	10.863
3	9 50 16.49	2.4067	10 17 4.5	9.738	3	11 40 20.51	2.1892	1 51 0.6	10.858
4	9 52 40.74	2.4017	10 7 18.6	9.793	4	11 42 31.93	2.1846	1 40 9.3	10.859
5	9 55 4.69	2.3966	9 57 29.4	9.846	5	11 44 43.14	2.1802	1 29 18.4	10.845
6	9 57 28.33	2.3915	9 47 37.1	9.897	6	11 46 54.15	2.1818	1 18 27.9	10.837
7	9 59 51.67	2.3865	9 37 41.7	9.948	7	11 49 4.95	2.1784	1 7 37.9	10.828
8	10 2 14.71	2.3814	9 27 43.3	9.997	8	11 51 15.55	2.1751	0 56 48.5	10.818
9	10 4 37.44	2.3763	9 17 42.0	10.045	9	11 53 25.96	2.1718	0 45 59.7	10.808
10	10 6 59.87	2.3713	9 7 37.9	10.092	10	11 55 36.17	2.1685	0 35 11.6	10.796
11	10 9 22.00	2.3664	8 57 31.0	10.137	11	11 57 46.18	2.1653	0 24 24.2	10.789
12	10 11 43.84	2.3615	8 47 21.5	10.180	12	11 59 56.00	2.1622	0 13 37.7	10.788
13	10 14 5.38	2.3565	8 37 9.4	10.222	13	12 2 5.64	2.1592	N. 0° 2' 52.0"	10.754
14	10 16 26.62	2.3515	8 26 54.9	10.262	14	12 4 15.10	2.1561	S. 0° 7' 52.8"	10.738
15	10 18 47.56	2.3465	8 16 38.0	10.301	15	12 6 24.37	2.1530	0 18 36.6	10.729
16	10 21 8.21	2.3417	8 6 18.8	10.339	16	12 8 33.46	2.1501	0 29 19.4	10.705
17	10 23 28.57	2.3369	7 55 57.3	10.377	17	12 10 42.38	2.1479	0 40 1.2	10.687
18	10 25 48.64	2.3321	7 45 33.6	10.412	18	12 12 51.13	2.1444	0 50 41.8	10.667
19	10 28 8.42	2.3272	7 35 7.9	10.445	19	12 14 59.71	2.1416	1 1 21.2	10.647
20	10 30 27.91	2.3224	7 24 40.2	10.477	20	12 17 8.12	2.1388	1 11 59.4	10.626
21	10 32 47.11	2.3177	7 14 10.6	10.508	21	12 19 16.37	2.1362	1 22 36.3	10.604
22	10 35 6.03	2.3130	7 3 39.2	10.537	22	12 21 24.46	2.1335	1 33 11.9	10.582
23	10 37 24.67	2.3083	6 53 6.1	10.566	23	12 23 32.39	2.1309	1 43 46.2	10.560
24	10 39 43.03	2.3037	N. 6° 42' 31.3"	10.593	24	12 25 40.17	2.1283	S. 1° 54' 19.1"	10.536

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 17.					SUNDAY 19.				
0	12 25 40.17	2.1263	S. 1° 54' 19.1"	10.536	0	14 5 45.39	2.0581	S. 9° 38' 21.6"	8.558
1	12 27 47.70	2.1267	2 4 50.5	10.510	1	14 7 48.86	2.0576	9 46 53.4	8.503
2	12 29 55.26	2.1233	2 15 20.3	10.483	2	14 9 52.31	2.0572	9 55 21.9	8.448
3	12 32 2.59	2.1210	2 25 48.5	10.457	3	14 11 55.73	2.0567	10 3 47.1	8.392
4	12 34 9.78	2.1187	2 36 15.1	10.430	4	14 13 59.12	2.0563	10 12 8.9	8.334
5	12 36 16.83	2.1163	2 46 40.0	10.401	5	14 16 2.49	2.0559	10 20 27.2	8.277
6	12 38 23.74	2.1140	2 57 3.2	10.373	6	14 18 5.83	2.0555	10 28 42.1	8.219
7	12 40 30.51	2.1118	3 7 24.6	10.343	7	14 20 9.15	2.0552	10 36 53.5	8.161
8	12 42 37.15	2.1097	3 17 44.2	10.313	8	14 22 12.46	2.0550	10 45 1.4	8.102
9	12 44 43.67	2.1076	3 28 2.0	10.281	9	14 24 15.75	2.0548	10 53 5.7	8.043
10	12 46 50.06	2.1055	3 38 17.9	10.249	10	14 26 19.03	2.0546	11 1 6.5	7.983
11	12 48 56.33	2.1034	3 48 31.8	10.216	11	14 28 22.30	2.0543	11 9 3.7	7.922
12	12 51 2.47	2.1013	3 58 43.8	10.182	12	14 30 25.55	2.0541	11 16 57.2	7.862
13	12 53 8.49	2.0994	4 8 53.7	10.147	13	14 32 28.79	2.0540	11 24 47.1	7.801
14	12 55 14.40	2.0976	4 19 1.5	10.113	14	14 34 32.03	2.0539	11 32 33.3	7.740
15	12 57 20.20	2.0957	4 29 7.3	10.078	15	14 36 35.26	2.0538	11 40 15.9	7.678
16	12 59 25.89	2.0939	4 39 10.9	10.043	16	14 38 38.48	2.0537	11 47 54.7	7.616
17	13 1 31.47	2.0922	4 49 12.3	10.005	17	14 40 41.70	2.0537	11 55 29.8	7.553
18	13 3 36.95	2.0904	4 59 11.5	9.967	18	14 42 44.92	2.0537	12 3 1.1	7.490
19	13 5 42.32	2.0887	5 9 8.4	9.929	19	14 44 48.14	2.0537	12 10 28.6	7.427
20	13 7 47.59	2.0871	5 19 3.0	9.890	20	14 46 51.36	2.0537	12 17 52.3	7.363
21	13 9 52.77	2.0856	5 28 55.2	9.850	21	14 48 54.58	2.0537	12 25 12.2	7.299
22	13 11 57.86	2.0841	5 38 45.0	9.810	22	14 50 57.80	2.0537	12 32 28.2	7.234
23	13 14 2.86	2.0826	S. 5 48 32.4	9.769	23	14 53 1.03	2.0536	S. 12 39 40.3	7.168
SATURDAY 18.					MONDAY 20.				
0	13 16 7.77	2.0811	S. 5 58 17.3	9.727	0	14 55 4.26	2.0536	S. 12 46 48.4	7.102
1	13 18 12.59	2.0797	6 7 59.7	9.685	1	14 57 7.50	2.0541	12 53 52.6	7.037
2	13 20 17.33	2.0783	6 17 39.5	9.643	2	14 59 10.75	2.0543	13 0 52.8	6.971
3	13 22 21.99	2.0770	6 27 16.8	9.600	3	15 1 14.01	2.0544	13 7 49.1	6.905
4	13 24 26.57	2.0757	6 36 51.5	9.556	4	15 3 17.28	2.0546	13 14 41.4	6.838
5	13 26 31.07	2.0744	6 46 23.5	9.511	5	15 5 20.56	2.0548	13 21 29.6	6.770
6	13 28 35.50	2.0732	6 55 52.8	9.466	6	15 7 23.85	2.0550	13 28 13.8	6.702
7	13 30 39.86	2.0721	7 5 19.4	9.420	7	15 9 27.16	2.0552	13 34 53.9	6.634
8	13 32 44.15	2.0709	7 14 43.2	9.373	8	15 11 30.48	2.0555	13 41 29.9	6.566
9	13 34 48.37	2.0698	7 24 4.2	9.326	9	15 13 33.82	2.0558	13 48 1.8	6.497
10	13 36 52.53	2.0688	7 33 22.4	9.279	10	15 15 37.18	2.0561	13 54 29.5	6.427
11	13 38 56.63	2.0679	7 42 37.7	9.232	11	15 17 40.55	2.0563	14 0 53.1	6.358
12	13 41 0.68	2.0670	7 51 50.2	9.183	12	15 19 43.94	2.0567	14 7 12.5	6.288
13	13 43 4.67	2.0660	8 0 59.7	9.133	13	15 21 47.35	2.0570	14 13 27.7	6.217
14	13 45 8.60	2.0651	8 10 6.2	9.083	14	15 23 50.78	2.0573	14 19 38.6	6.147
15	13 47 12.48	2.0642	8 19 9.7	9.033	15	15 25 54.23	2.0577	14 25 45.3	6.076
16	13 49 16.31	2.0634	8 28 10.2	8.983	16	15 27 57.70	2.0580	14 31 47.7	6.004
17	13 51 20.09	2.0626	8 37 7.7	8.932	17	15 30 1.19	2.0584	14 37 45.8	5.933
18	13 53 23.82	2.0618	8 46 2.1	8.880	18	15 32 4.71	2.0588	14 43 39.7	5.861
19	13 55 27.51	2.0611	8 54 53.3	8.827	19	15 34 8.25	2.0592	14 49 29.2	5.788
20	13 57 31.16	2.0605	9 3 41.4	8.775	20	15 36 11.81	2.0596	14 55 14.3	5.716
21	13 59 34.77	2.0599	9 12 26.3	8.723	21	15 38 15.40	2.0600	15 0 55.1	5.643
22	14 1 38.35	2.0593	9 21 8.0	8.668	22	15 40 19.01	2.0604	15 6 31.5	5.570
23	14 3 41.89	2.0587	9 29 46.4	8.613	23	15 42 22.65	2.0608	15 12 3.5	5.496
24	14 5 45.39	2.0581	S. 9 38 21.6	8.558	24	15 44 26.31	2.0612	S. 15 17 31.0	5.422



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 21.					THURSDAY 23.				
0	<sup>h</sup> 15 <sup>m</sup> 44 <sup>s</sup> 26.31	2.0619	S. 15° 17' 31.0"	5.422	0	<sup>h</sup> 17 <sup>m</sup> 23 <sup>s</sup> 52.59	2.0794	S. 18° 7' 41.8"	1.590
1	15 46 30.00	2.0617	15 22 54.1	5.347	1	17 25 57.36	2.0796	18 9 14.7	1.507
2	15 48 33.72	2.0622	15 28 12.7	5.273	2	17 28 2.14	2.0797	18 10 42.6	1.423
3	15 50 37.46	2.0626	15 33 26.9	5.199	3	17 30 6.93	2.0798	18 12 5.5	1.339
4	15 52 41.23	2.0631	15 38 36.6	5.123	4	17 32 11.72	2.0799	18 13 23.3	1.255
5	15 54 45.03	2.0635	15 43 41.7	5.047	5	17 34 16.52	2.0800	18 14 36.1	1.171
6	15 56 48.85	2.0639	15 48 42.3	4.972	6	17 36 21.32	2.0800	18 15 43.8	1.087
7	15 58 52.70	2.0644	15 53 38.3	4.896	7	17 38 26.12	2.0800	18 16 46.5	1.002
8	16 0 56.58	2.0649	15 58 29.8	4.820	8	17 40 30.92	2.0801	18 17 44.1	0.918
9	16 3 0.49	2.0654	16 3 16.7	4.743	9	17 42 35.73	2.0801	18 18 36.7	0.834
10	16 5 4.43	2.0659	16 7 59.0	4.667	10	17 44 40.53	2.0800	18 19 24.2	0.750
11	16 7 8.40	2.0663	16 12 36.7	4.590	11	17 46 45.33	2.0800	18 20 6.7	0.666
12	16 9 12.39	2.0667	16 17 9.8	4.512	12	17 48 50.13	2.0799	18 20 44.1	0.581
13	16 11 16.41	2.0672	16 21 38.2	4.435	13	17 50 54.92	2.0798	18 21 16.4	0.497
14	16 13 20.46	2.0677	16 26 2.0	4.357	14	17 52 59.71	2.0797	18 21 43.7	0.419
15	16 15 24.54	2.0682	16 30 21.1	4.279	15	17 55 4.49	2.0796	18 22 5.9	0.338
16	16 17 28.65	2.0687	16 34 35.5	4.200	16	17 57 9.26	2.0794	18 22 23.1	0.244
17	16 19 32.79	2.0692	16 38 45.1	4.121	17	17 59 14.02	2.0792	18 22 35.2	0.159
18	16 21 36.95	2.0696	16 42 50.0	4.042	18	18 1 18.77	2.0791	18 22 42.2	- 0.075
19	16 23 41.14	2.0701	16 46 50.2	3.963	19	18 3 23.51	2.0789	18 22 44.2	+ 0.009
20	16 25 45.36	2.0705	16 50 45.6	3.884	20	18 5 28.24	2.0787	18 22 41.1	0.094
21	16 27 49.60	2.0709	16 54 36.3	3.805	21	18 7 32.95	2.0784	18 22 32.9	0.178
22	16 29 53.87	2.0714	16 58 22.2	3.725	22	18 9 37.65	2.0782	18 22 19.7	0.262
23	16 31 58.17	2.0718	S. 17° 2' 3.3"	3.645	23	18 11 42.33	2.0778	S. 18° 22' 1.4"	0.347
WEDNESDAY 22.					FRIDAY 24.				
0	16 34 2.49	2.0722	S. 17° 5' 39.6"	3.565	0	18 13 46.99	2.0775	S. 18° 21' 38.1"	0.431
1	16 36 6.84	2.0727	17 9 11.1	3.485	1	18 15 51.63	2.0772	18 21 9.7	0.515
2	16 38 11.21	2.0731	17 12 37.8	3.404	2	18 17 56.25	2.0768	18 20 36.3	0.598
3	16 40 15.61	2.0735	17 15 59.6	3.323	3	18 20 0.85	2.0765	18 19 57.9	0.682
4	16 42 20.03	2.0739	17 19 16.6	3.242	4	18 22 5.43	2.0761	18 19 14.4	0.766
5	16 44 24.48	2.0743	17 22 28.7	3.161	5	18 24 9.98	2.0757	18 18 25.9	0.850
6	16 46 28.95	2.0747	17 25 35.9	3.080	6	18 26 14.51	2.0752	18 17 32.4	0.933
7	16 48 33.44	2.0750	17 28 38.3	2.999	7	18 28 19.01	2.0747	18 16 33.9	1.017
8	16 50 37.95	2.0753	17 31 35.8	2.917	8	18 30 23.48	2.0743	18 15 30.3	1.102
9	16 52 42.48	2.0757	17 34 28.3	2.834	9	18 32 27.93	2.0739	18 14 21.7	1.185
10	16 54 47.04	2.0762	17 37 15.9	2.753	10	18 34 32.35	2.0733	18 13 8.1	1.268
11	16 56 51.62	2.0765	17 39 58.6	2.671	11	18 36 36.73	2.0728	18 11 49.5	1.351
12	16 58 56.22	2.0768	17 42 36.4	2.588	12	18 38 41.08	2.0723	18 10 26.0	1.433
13	17 1 0.84	2.0771	17 45 9.2	2.506	13	18 40 45.40	2.0717	18 8 57.5	1.517
14	17 3 5.47	2.0774	17 47 37.1	2.423	14	18 42 49.68	2.0710	18 7 24.0	1.600
15	17 5 10.12	2.0776	17 50 0.0	2.340	15	18 44 53.92	2.0704	18 5 45.5	1.682
16	17 7 14.78	2.0778	17 52 17.9	2.257	16	18 46 58.13	2.0698	18 4 2.1	1.764
17	17 9 19.46	2.0781	17 54 30.9	2.175	17	18 49 2.30	2.0692	18 2 13.8	1.847
18	17 11 24.16	2.0784	17 56 38.9	2.092	18	18 51 6.43	2.0685	18 0 20.5	1.929
19	17 13 28.87	2.0786	17 58 41.9	2.008	19	18 53 10.52	2.0678	17 58 22.3	2.011
20	17 15 33.59	2.0788	18 0 39.9	1.925	20	18 55 14.57	2.0671	17 56 19.2	2.093
21	17 17 38.33	2.0791	18 2 32.9	1.843	21	18 57 18.57	2.0663	17 54 11.2	2.174
22	17 19 43.08	2.0792	18 4 20.9	1.758	22	18 59 22.53	2.0656	17 51 58.3	2.256
23	17 21 47.83	2.0793	18 6 3.9	1.674	23	19 1 26.44	2.0648	17 49 40.5	2.337
24	17 23 52.59	2.0794	S. 18° 7' 41.8"	1.590	24	19 3 30.31	2.0641	S. 17° 47' 17.8"	2.418

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 25.					MONDAY 27.				
0	19 3 30.31	2.0641	S. 17° 47' 17.8	2.418	0	20 41 24.65	2.0118	S. 14° 22' 59.6	5.967
1	19 5 34.13	2.0633	17 44 50.3	2.498	1	20 43 25.32	2.0106	14 16 59.6	6.039
2	19 7 37.90	2.0624	17 42 18.0	2.579	2	20 45 25.92	2.0093	14 10 55.8	6.096
3	19 9 41.62	2.0616	17 39 40.8	2.660	3	20 47 26.44	2.0081	14 4 48.1	6.160
4	19 11 45.29	2.0607	17 36 58.8	2.740	4	20 49 26.89	2.0069	13 58 36.6	6.223
5	19 13 48.91	2.0599	17 34 12.0	2.820	5	20 51 27.27	2.0057	13 52 21.3	6.286
6	19 15 52.48	2.0590	17 31 20.4	2.900	6	20 53 27.57	2.0044	13 46 2.2	6.349
7	19 17 55.99	2.0581	17 28 24.0	2.979	7	20 55 27.80	2.0039	13 39 39.4	6.411
8	19 19 59.45	2.0573	17 25 22.9	3.058	8	20 57 27.96	2.0031	13 33 12.9	6.473
9	19 22 2.85	2.0565	17 22 17.0	3.137	9	20 59 28.05	2.0020	13 26 42.6	6.535
10	19 24 6.20	2.0553	17 19 6.4	3.216	10	21 1 28.07	1.9997	13 20 8.7	6.596
11	19 26 9.49	2.0543	17 15 51.1	3.295	11	21 3 28.02	1.9986	13 13 31.2	6.655
12	19 28 12.72	2.0533	17 12 31.0	3.373	12	21 5 27.90	1.9974	13 6 50.1	6.715
13	19 30 15.89	2.0523	17 9 6.3	3.451	13	21 7 27.71	1.9962	13 0 5.4	6.774
14	19 32 19.00	2.0513	17 5 36.9	3.528	14	21 9 27.45	1.9951	12 53 17.2	6.833
15	19 34 22.05	2.0503	17 2 2.9	3.605	15	21 11 27.12	1.9939	12 46 25.4	6.891
16	19 36 25.04	2.0493	16 58 24.3	3.682	16	21 13 26.72	1.9928	12 39 30.2	6.949
17	19 38 27.97	2.0482	16 54 41.0	3.760	17	21 15 26.26	1.9917	12 32 31.5	7.007
18	19 40 30.83	2.0472	16 50 53.1	3.837	18	21 17 25.73	1.9906	12 25 29.4	7.063
19	19 42 33.63	2.0462	16 47 0.6	3.913	19	21 19 25.13	1.9895	12 18 23.9	7.120
20	19 44 36.37	2.0451	16 43 3.6	3.988	20	21 21 24.47	1.9885	12 11 15.0	7.176
21	19 46 39.04	2.0439	16 39 2.0	4.064	21	21 23 23.75	1.9874	12 4 2.8	7.231
22	19 48 41.64	2.0428	16 34 55.9	4.139	22	21 25 22.96	1.9863	11 56 47.3	7.286
23	19 50 44.18	2.0417	S. 16° 30' 45.3	4.213	23	21 27 22.11	1.9853	S. 11° 49' 28.5	7.341
SUNDAY 26.					TUESDAY 28.				
0	19 52 46.65	2.0406	S. 16° 26' 30.3	4.286	0	21 29 21.20	1.9843	S. 11° 42' 6.4	7.395
1	19 54 49.05	2.0394	16 22 10.8	4.363	1	21 31 20.23	1.9832	11 34 41.1	7.448
2	19 56 51.38	2.0383	16 17 46.8	4.437	2	21 33 19.19	1.9822	11 27 12.7	7.500
3	19 58 53.64	2.0372	16 13 18.4	4.510	3	21 35 18.09	1.9812	11 19 41.1	7.553
4	20 0 55.84	2.0361	16 8 45.6	4.583	4	21 37 16.94	1.9803	11 12 6.3	7.605
5	20 2 57.97	2.0349	16 4 8.4	4.656	5	21 39 15.73	1.9793	11 4 28.5	7.656
6	20 5 0.03	2.0337	15 59 26.9	4.729	6	21 41 14.46	1.9784	10 56 47.6	7.707
7	20 7 2.02	2.0325	15 54 41.0	4.801	7	21 43 13.14	1.9775	10 49 3.6	7.758
8	20 9 3.93	2.0313	15 49 50.8	4.872	8	21 45 11.76	1.9766	10 41 16.6	7.807
9	20 11 5.77	2.0301	15 44 56.3	4.944	9	21 47 10.33	1.9757	10 33 26.7	7.856
10	20 13 7.54	2.0289	15 39 57.5	5.015	10	21 49 8.85	1.9749	10 25 33.9	7.904
11	20 15 9.24	2.0277	15 34 54.5	5.085	11	21 51 7.32	1.9741	10 17 38.2	7.953
12	20 17 10.87	2.0265	15 29 47.3	5.155	12	21 53 5.74	1.9732	10 9 39.6	8.001
13	20 19 12.42	2.0253	15 24 35.9	5.225	13	21 55 4.11	1.9724	10 1 38.1	8.048
14	20 21 13.90	2.0241	15 19 20.3	5.295	14	21 57 2.43	1.9717	9 53 33.9	8.094
15	20 23 15.31	2.0228	15 14 0.5	5.364	15	21 59 0.71	1.9709	9 45 26.9	8.140
16	20 25 16.64	2.0216	15 8 36.6	5.433	16	22 0 58.94	1.9702	9 37 17.1	8.186
17	20 27 17.90	2.0204	15 3 8.6	5.501	17	22 2 57.13	1.9695	9 29 4.6	8.230
18	20 29 19.09	2.0192	14 57 36.5	5.568	18	22 4 55.28	1.9688	9 20 49.5	8.274
19	20 31 20.20	2.0179	14 52 0.4	5.636	19	22 6 53.39	1.9682	9 12 31.7	8.318
20	20 33 21.24	2.0167	14 46 20.2	5.703	20	22 8 51.46	1.9675	9 4 11.3	8.362
21	20 35 22.20	2.0154	14 40 36.0	5.770	21	22 10 49.49	1.9668	8 55 48.3	8.404
22	20 37 23.09	2.0142	14 34 47.8	5.836	22	22 12 47.48	1.9662	8 47 22.8	8.446
23	20 39 23.91	2.0130	14 28 55.7	5.902	23	22 14 45.44	1.9657	8 38 54.8	8.488
24	20 41 24.65	2.0118	S. 14° 22' 59.6	5.967	24	22 16 43.37	1.9653	S. 8° 30' 24.2	8.530

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.																									
WEDNESDAY 29.					FRIDAY 31.																													
0	22 16 43.37	1.9659	S. 8 30 24.3	8.530	0	23 51 2.38	1.9738	S. 1 4 48.5	9.804																									
1	22 18 41.27	1.9647	8 21 51.3	8.570	1	23 53 1.13	1.9796	0 54 59.9	9.816																									
2	22 20 39.14	1.9649	8 13 15.8	8.609	2	23 54 59.96	1.9811	0 45 10.6	9.837																									
3	22 22 36.98	1.9638	8 4 38.1	8.648	3	23 56 58.86	1.9804	0 35 20.7	9.837																									
4	22 24 34.80	1.9634	7 55 58.0	8.687	4	23 58 57.84	1.9838	0 25 30.2	9.846																									
5	22 26 32.59	1.9629	7 47 15.6	8.726	5	0 0 56.91	1.9859	0 15 39.2	9.854																									
6	22 28 30.35	1.9625	7 38 30.9	8.763	6	0 2 56.06	1.9868	S. 0 5 47.7	9.863																									
7	22 30 28.09	1.9622	7 29 44.0	8.800	7	0 4 55.30	1.9881	N. 0 4 4.3	9.870																									
8	22 32 25.82	1.9620	7 20 54.9	8.837	8	0 6 54.63	1.9897	0 13 56.7	9.877																									
9	22 34 23.53	1.9617	7 12 3.6	8.873	9	0 8 54.06	1.9913	0 23 49.5	9.888																									
10	22 36 21.23	1.9615	7 3 10.2	8.908	10	0 10 53.58	1.9929	0 33 42.6	9.887																									
11	22 38 18.91	1.9613	6 54 14.7	8.943	11	0 12 53.20	1.9946	0 43 36.0	9.892																									
12	22 40 16.58	1.9611	6 45 17.0	8.978	12	0 14 52.93	1.9963	0 53 29.7	9.897																									
13	22 42 14.24	1.9609	6 36 17.3	9.011	13	0 16 52.76	1.9981	1 3 23.6	9.900																									
14	22 44 11.89	1.9608	-6 27 15.7	9.043	14	0 18 52.70	1.9998	1 13 17.7	9.903																									
15	22 46 9.54	1.9607	6 18 12.1	9.076	15	0 20 52.74	2.0017	1 23 11.9	9.904																									
16	22 48 7.18	1.9607	6 9 6.6	9.107	16	0 22 52.90	2.0037	1 33 6.2	9.905																									
17	22 50 4.82	1.9606	5 59 59.2	9.139	17	0 24 53.18	2.0057	1 43 0.5	9.905																									
18	22 52 2.45	1.9606	5 50 49.9	9.170	18	0 26 53.58	2.0077	1 52 54.8	9.905																									
19	22 54 0.09	1.9607	5 41 38.8	9.200	19	0 28 54.10	2.0097	2 2 49.1	9.904																									
20	22 55 57.73	1.9607	5 32 25.9	9.229	20	0 30 54.75	2.0118	2 12 43.3	9.903																									
21	22 57 55.38	1.9608	5 23 11.3	9.258	21	0 32 55.52	2.0139	2 22 37.4	9.900																									
22	22 59 53.03	1.9610	5 13 54.9	9.286	22	0 34 56.42	2.0161	2 32 31.3	9.897																									
23	23 1 50.70	1.9612	S. 5 4 36.9	9.314	23	0 36 57.46	2.0184	N. 2 42 25.0	9.893																									
THURSDAY 30.					SATURDAY, AUGUST 1.																													
0	23 3 48.38	1.9614	S. 4 55 17.2	9.341	0	0 38 58.63	2.0207	N. 2 52 18.4	9.887																									
1	23 5 46.07	1.9617	4 45 55.9	9.367	PHASES OF THE MOON.																													
2	23 7 43.78	1.9620	4 36 33.1	9.393																														
3	23 9 41.51	1.9623	4 27 8.7	9.419																														
4	23 11 39.26	1.9627	4 17 42.8	9.443																														
5	23 13 37.04	1.9632	4 8 15.5	9.467	<table><tr><td></td><td></td><td>d</td><td>h</td><td>m</td></tr><tr><td>☾</td><td>Last Quarter . . .</td><td>July</td><td>5</td><td>0 26.0</td></tr><tr><td>●</td><td>New Moon . . . . .</td><td></td><td>11</td><td>17 15.8</td></tr><tr><td>☽</td><td>First Quarter . . . .</td><td></td><td>18</td><td>12 19.8</td></tr><tr><td>○</td><td>Full Moon . . . . .</td><td></td><td>26</td><td>14 22.8</td></tr></table>							d	h	m	☾	Last Quarter . . .	July	5	0 26.0	●	New Moon . . . . .		11	17 15.8	☽	First Quarter . . . .		18	12 19.8	○	Full Moon . . . . .		26	14 22.8
		d	h	m																														
☾	Last Quarter . . .	July	5	0 26.0																														
●	New Moon . . . . .		11	17 15.8																														
☽	First Quarter . . . .		18	12 19.8																														
○	Full Moon . . . . .		26	14 22.8																														
6	23 15 34.84	1.9636	3 58 46.7	9.491	<table><tr><td></td><td></td><td>d</td><td>h</td><td></td></tr><tr><td>☾</td><td>Perigee . . . . .</td><td>July</td><td>11</td><td>13.5</td></tr><tr><td>☾</td><td>Apogee . . . . .</td><td></td><td>24</td><td>21.4</td></tr></table>							d	h		☾	Perigee . . . . .	July	11	13.5	☾	Apogee . . . . .		24	21.4										
		d	h																															
☾	Perigee . . . . .	July	11	13.5																														
☾	Apogee . . . . .		24	21.4																														
7	23 17 32.67	1.9641	3 49 16.6	9.514																														
8	23 19 30.53	1.9646	3 39 45.1	9.536																														
9	23 21 28.42	1.9650	3 30 12.3	9.557																														
10	23 23 26.35	1.9657	3 20 38.2	9.578																														
11	23 25 24.31	1.9663	3 11 2.9	9.598																														
12	23 27 22.31	1.9670	3 1 26.4	9.618																														
13	23 29 20.35	1.9678	2 51 48.7	9.637																														
14	23 31 18.44	1.9686	2 42 9.9	9.656																														
15	23 33 16.58	1.9694	2 32 30.0	9.674																														
16	23 35 14.77	1.9703	2 22 49.0	9.691																														
17	23 37 13.01	1.9712	2 13 7.1	9.707																														
18	23 39 11.31	1.9721	2 3 24.2	9.723																														
19	23 41 9.66	1.9730	1 53 40.3	9.738																														
20	23 43 8.07	1.9741	1 43 55.6	9.753																														
21	23 45 6.55	1.9752	1 34 10.0	9.767																														
22	23 47 5.09	1.9763	1 24 23.6	9.780																														
23	23 49 3.70	1.9774	1 14 36.4	9.792																														
24	23 51 2.38	1.9786	S. 1 4 48.5	9.804																														

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Antares W.	75° 57' 1"	3086	77° 25' 52"	3059	78° 54' 52"	3059	80° 24' 0"	3046
	α Arietis E.	72 1 0	3139	70 33 29	3198	69 5 53	3194	67 38 13	3180
	Aldebaran E.	104 33 53	3006	103 3 48	3000	101 33 35	2994	100 3 15	2987
	MARS E.	105 10 15	3068	103 45 42	3076	102 21 2	3070	100 56 15	3063
	SUN E.	135 50 38	3400	134 28 21	3391	133 5 54	3383	131 43 18	3374
2	Antares W.	87 51 56	3006	89 22 1	2997	90 52 17	2989	92 22 44	2980
	α Aquilæ W.	43 34 43	3042	44 47 20	3082	46 0 58	3085	47 15 34	3073
	α Arietis E.	60 18 44	3102	58 50 37	3099	57 22 26	3095	55 54 10	3092
	Aldebaran E.	92 29 21	2949	90 58 4	2941	89 26 37	2933	87 54 59	2923
	MARS E.	93 50 6	3021	92 24 22	3013	90 58 28	3004	89 32 23	3193
	SUN E.	124 47 47	3399	123 24 9	3319	122 0 19	3306	120 36 17	3297
3	Antares W.	99 57 54	2931	101 29 34	2990	103 1 27	2998	104 33 34	2998
	α Aquilæ W.	53 41 18	3054	55 0 43	3017	56 20 47	3049	57 41 31	3049
	α Arietis E.	48 32 3	3069	47 3 31	3082	45 34 59	3069	44 6 27	3063
	Aldebaran E.	80 13 44	2973	78 40 49	2981	77 7 40	2949	75 34 16	2937
	MARS E.	82 18 54	3139	80 51 32	3198	79 23 56	3115	77 56 5	3104
	SUN E.	113 32 52	3240	112 7 30	3227	110 41 53	3214	109 16 0	3200
4	α Aquilæ W.	64 34 6	3300	65 58 17	3273	67 23 0	3247	68 48 13	3222
	Fomalhaut W.	34 40 33	4149	35 49 48	4032	37 0 56	3996	38 13 49	3930
	Aldebaran E.	67 43 13	2773	66 8 9	2759	64 32 47	2744	62 57 6	2730
	MARS E.	70 32 58	3036	69 3 30	3022	67 33 45	3008	66 3 42	2993
	SUN E.	102 2 31	3129	100 34 57	3114	99 7 5	3099	97 38 54	3083
5	α Aquilæ W.	76 1 34	3105	77 29 37	3082	78 58 8	3061	80 27 5	3041
	Fomalhaut W.	44 40 41	3455	46 1 55	3390	47 24 16	3340	48 47 41	3288
	α Pegasi W.	29 30 51	3796	30 45 57	3676	32 3 10	3567	33 22 20	3471
	Aldebaran E.	54 53 45	2953	53 16 2	2937	51 37 58	2921	49 59 31	2904
	MARS E.	58 28 38	2915	56 56 38	2898	55 24 17	2889	53 51 35	2866
	SUN E.	90 13 1	3000	88 42 48	2982	87 12 13	2965	85 41 16	2946
6	α Aquilæ W.	87 58 2	2944	89 29 25	2927	91 1 10	2909	92 33 17	2893
	Fomalhaut W.	55 58 55	3068	57 27 44	3030	58 57 19	2993	60 27 40	2959
	α Pegasi W.	40 22 5	3110	41 50 2	3056	43 19 6	3004	44 49 14	2955
	Aldebaran E.	41 41 32	2519	40 0 45	2501	38 19 33	2484	36 37 57	2466
	MARS E.	46 2 43	2769	44 27 51	2766	42 52 38	2749	41 17 3	2739
	SUN E.	78 0 46	2955	76 27 29	2936	74 53 48	2918	73 19 43	2798
7	Fomalhaut W.	68 9 47	2906	69 44 8	2778	71 19 5	2750	72 54 38	2725
	α Pegasi W.	52 33 58	2755	54 9 25	2791	55 45 37	2688	57 22 33	2657
	MARS E.	33 13 50	2957	31 36 12	2944	29 58 17	2939	28 20 5	2931
	SUN E.	65 23 4	2704	63 46 30	2685	62 9 30	2666	60 32 5	2649
8	Fomalhaut W.	81 0 21	2613	82 38 58	2593	84 18 2	2575	85 57 31	2557
	α Pegasi W.	65 37 7	2591	67 17 51	2497	68 59 9	2474	70 40 59	2453
	SUN E.	52 18 54	2560	50 39 4	2544	48 58 52	2527	47 18 17	2519
9	Fomalhaut W.	94 20 36	2465	96 2 10	2474	97 44 0	2465	99 26 3	2455
	α Pegasi W.	79 17 25	2357	81 2 1	2349	82 46 59	2327	84 32 19	2313
	α Arietis W.	35 45 17	2448	37 27 44	2407	39 11 9	2371	40 55 26	2338
	SUN E.	38 50 11	2443	37 7 38	2432	35 24 49	2422	33 41 45	2413

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
1	Antares W.	81° 53' 16"	3039	83° 22' 41"	3030	84° 52' 16"	3023	86° 22' 1"	3014
	α Arietis E.	66 10 28	3117	64 42 39	3113	63 14 45	3110	61 46 47	3105
	Aldebaran E.	98 32 46	2981	97 2 9	2973	95 31 23	2965	94 0 27	2957
	Mars E.	99 31 20	3255	98 6 16	3247	96 41 3	3239	95 15 40	3230
	Sun E.	130 20 32	3365	128 57 36	3357	127 34 30	3348	126 11 14	3338
2	Antares W.	93 53 22	2970	95 24 12	2961	96 55 13	2951	98 26 27	2941
	α Aquilæ W.	48 31 5	3794	49 47 27	3777	51 4 38	3764	52 22 36	3753
	α Arietis E.	54 25 51	3090	52 57 29	3087	51 29 3	3084	50 0 34	3082
	Aldebaran E.	86 23 9	2913	84 51 7	2903	83 18 52	2894	81 46 25	2883
	Mars E.	88 6 6	3183	86 30 37	3173	85 12 56	3163	83 46 2	3151
	Sun E.	119 12 2	3286	117 47 34	3275	116 22 53	3264	114 57 59	3253
3	Antares W.	106 5 55	2987	107 38 31	2978	109 11 21	2964	110 44 26	2952
	α Aquilæ W.	59 2 52	3417	60 24 49	3398	61 47 21	3387	63 10 27	3386
	α Arietis E.	42 37 57	3087	41 9 31	3091	39 41 10	3096	38 12 56	3105
	Aldebaran E.	74 0 36	2994	72 26 40	2919	70 52 28	2799	69 17 59	2786
	Mars E.	76 28 0	3091	74 59 39	3078	73 31 2	3064	72 2 8	3051
	Sun E.	107 49 51	3187	106 23 26	3173	104 56 45	3159	103 29 47	3144
4	α Aquilæ W.	70 13 56	3198	71 40 8	3173	73 6 49	3150	74 33 58	3136
	Fomalhaut W.	39 28 20	3743	40 44 22	3693	42 1 50	3587	43 20 38	3519
	Aldebaran E.	61 21 6	2715	59 44 46	2700	58 8 6	2685	56 31 6	2669
	Mars E.	64 33 20	2977	63 2 39	2998	61 31 38	2946	60 0 18	2931
	Sun E.	96 10 24	3067	94 41 34	3051	93 12 24	3034	91 42 53	3017
5	α Aquilæ W.	81 56 27	3021	83 26 14	3001	84 56 26	2981	86 27 2	2969
	Fomalhaut W.	50 12 6	3940	51 37 28	3192	53 3 45	3149	54 30 55	3106
	α Pegasi W.	34 43 16	3366	36 5 49	3306	37 29 53	3236	38 55 20	3170
	Aldebaran E.	48 20 42	2568	46 41 30	2570	45 1 54	2553	43 21 55	2536
	Mars E.	52 18 32	2948	50 45 7	2932	49 11 21	2915	47 37 13	2798
	Sun E.	84 9 56	2929	82 38 14	2910	81 6 8	2892	79 33 39	2873
6	α Aquilæ W.	94 5 45	2976	95 38 34	2961	97 11 43	2946	98 45 11	2933
	Fomalhaut W.	61 58 44	2996	63 30 30	2994	65 2 57	2983	66 36 3	2974
	α Pegasi W.	46 20 23	2911	47 52 28	2909	49 25 27	2898	50 59 18	2791
	Aldebaran E.	34 55 56	2448	33 13 30	2431	31 30 39	2412	29 47 22	2395
	Mars E.	39 41 6	2716	38 4 48	2701	36 28 9	2685	34 51 9	2671
	Sun E.	71 45 13	2779	70 10 18	2760	68 34 58	2741	66 59 13	2723
7	Fomalhaut W.	74 30 44	2701	76 7 22	2678	77 44 32	2655	79 22 12	2634
	α Pegasi W.	59 0 10	2998	60 38 27	2999	62 17 23	2979	63 56 57	2945
	Mars E.	26 41 38	2612	25 2 59	2606	23 24 12	2609	21 45 20	2603
	Sun E.	58 54 16	2630	57 16 2	2619	55 37 23	2604	53 58 20	2575
8	Fomalhaut W.	87 37 25	2540	89 17 42	2526	90 58 20	2510	92 39 19	2497
	α Pegasi W.	72 23 19	2431	74 6 9	2411	75 49 28	2392	77 33 14	2375
	Sun E.	45 37 20	2497	43 56 2	2482	42 14 24	2469	40 32 27	2455
9	Fomalhaut W.	101 8 19	2448	102 50 45	2443	104 33 18	2439	106 15 57	2437
	α Pegasi W.	86 17 59	2300	88 3 58	2289	89 50 14	2278	91 36 46	2268
	α Arietis W.	42 40 30	2308	44 26 18	2281	46 12 46	2265	47 59 51	2253
	Sun E.	31 58 29	2405	30 15 2	2399	28 31 26	2385	26 47 44	2363

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
13	SUN W.	18° 39' 14"	9439	20° 21' 53"	9498	22° 4' 48"	9499	23° 47' 51"	9491
	Spica E.	72 41 35	9039	70 48 51	9049	68 56 22	9059	67 4 9	9063
	Antares E.	118 12 1	9093	116 20 51	9100	114 29 52	9108	112 39 5	9116
14	SUN W.	32 22 13	9459	34 4 34	9463	35 46 39	9475	37 28 27	9488
	Spica E.	57 47 42	9199	55 57 27	9143	54 7 34	9159	52 18 4	9174
	Antares E.	103 28 58	9173	101 39 50	9186	99 51 2	9200	98 2 35	9214
15	SUN W.	45 52 34	9564	47 32 18	9581	49 11 39	9599	50 50 36	9617
	VENUS W.	26 39 51	9719	28 16 15	9729	29 52 26	9733	31 28 22	9747
	Spica E.	43 16 51	9363	41 29 57	9391	39 43 30	9301	37 57 32	9391
	Antares E.	89 5 59	9395	87 19 52	9313	85 34 11	9331	83 48 56	9348
16	SUN W.	58 59 10	9709	60 35 38	9739	62 11 40	9747	63 47 17	9767
	VENUS W.	39 23 16	9695	40 57 12	9642	42 30 45	9660	44 3 55	9678
	Regulus W.	24 48 34	9411	26 31 53	9495	28 14 51	9441	29 57 27	9458
	JUPITER W.	17 57 56	9497	19 39 14	9506	21 20 19	9518	23 1 7	9531
	Spica E.	29 15 15	9431	27 32 25	9455	25 50 9	9489	24 8 30	9510
	Antares E.	75 9 18	9443	73 26 44	9469	71 44 38	9499	70 3 0	9509
17	SUN W.	71 39 0	9863	73 12 6	9863	74 44 47	9901	76 17 4	9981
	VENUS W.	51 43 55	9970	53 14 45	9969	54 45 11	3008	56 15 14	3096
	Regulus W.	38 24 39	9542	40 4 54	9559	41 44 46	9575	43 24 15	9593
	JUPITER W.	31 20 7	9809	32 58 50	9896	34 37 10	9942	36 15 8	9959
	Antares E.	61 41 47	9804	60 2 57	9894	58 24 35	9945	56 46 41	9966
18	SUN W.	83 52 34	3019	85 22 32	3030	86 52 8	3047	88 21 23	3065
	VENUS W.	63 39 50	3117	65 7 39	3134	66 35 7	3152	68 2 14	3168
	Regulus W.	51 35 53	9875	53 13 6	9909	54 49 57	9707	56 26 27	9793
	JUPITER W.	44 19 21	9741	45 55 6	9758	47 30 29	9773	49 5 32	9789
	Antares E.	48 44 15	9773	47 9 12	9795	45 34 38	9818	44 0 33	9841
	α Aquilæ E.	98 2 55	3100	96 34 46	3114	95 6 54	3198	93 39 18	3143
19	SUN W.	95 42 29	3144	97 9 45	3160	98 36 42	3174	100 3 22	3189
	VENUS W.	75 12 53	3949	76 38 4	3964	78 2 58	3979	79 27 34	3994
	Regulus W.	64 23 56	9796	65 58 29	9811	67 32 43	9894	69 6 40	9937
	JUPITER W.	56 55 46	9863	58 28 52	9877	60 1 40	9891	61 34 11	9904
	Antares E.	36 17 48	9906	34 46 53	9905	33 16 34	3095	31 46 52	3058
	α Aquilæ E.	86 25 47	3219	85 0 0	3235	83 34 32	3251	82 9 23	3267
20	SUN W.	107 12 31	3355	108 37 35	3368	110 2 24	3380	111 26 59	3391
	VENUS W.	86 26 32	3380	87 49 34	3379	89 12 23	3383	90 34 59	3394
	Regulus W.	76 52 20	9997	78 24 43	9909	79 56 51	9990	81 28 45	9999
	JUPITER W.	69 12 40	9905	70 43 36	9977	72 14 18	9967	73 44 47	9997
	Spica W.	23 34 36	3290	25 5 39	3263	26 36 38	3268	28 7 31	3273
	α Aquilæ E.	75 8 35	3355	73 45 27	3373	72 22 40	3399	71 0 14	3411
21	SUN W.	118 26 46	3349	119 50 9	3351	121 13 21	3360	122 36 23	3368
	VENUS W.	97 24 52	3446	98 46 17	3454	100 7 32	3464	101 28 38	3471
	Regulus W.	89 5 14	9975	90 35 58	9963	92 6 32	9991	93 36 56	9996
	JUPITER W.	81 14 6	3044	82 43 24	3052	84 12 32	3060	85 41 30	3068
	Spica W.	35 40 14	3001	37 10 25	3008	38 40 28	3014	40 10 23	3090
	α Aquilæ E.	64 13 44	3516	62 53 38	3539	61 33 57	3564	60 14 43	3588

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
13	SUN	W.	25 30 56	9493	27 13 58	9498	28 56 53	9494	30 39 39	9443
	Spica	E.	65 12 13	9075	63 20 35	9088	61 29 17	9101	59 38 19	9115
	Antares	E.	110 48 31	9996	108 58 12	9137	107 8 10	9149	105 18 25	9161
14	SUN	W.	39 9 57	9509	40 51 8	9517	42 31 58	9539	44 12 27	9548
	Spica	E.	50 28 58	9191	48 40 17	9208	46 52 2	9296	45 4 13	9344
	Antares	E.	96 14 29	9930	94 26 46	9945	92 39 26	9999	90 52 30	9979
15	SUN	W.	52 29 8	9635	54 7 16	9653	55 44 59	9679	57 22 17	9690
	VENUS	W.	33 4 0	9761	34 39 19	9775	36 14 19	9792	37 48 58	9806
	Spica	E.	36 12 3	9349	34 27 4	9363	32 42 36	9394	30 58 39	9408
	Antares	E.	82 4 7	9996	80 19 44	9995	78 35 48	9404	76 52 19	9494
16	SUN	W.	65 22 28	9798	66 57 14	9806	68 31 34	9825	70 5 29	9844
	VENUS	W.	45 36 42	9996	47 9 6	9915	48 41 6	9934	50 12 42	9952
	Regulus	W.	31 39 40	9474	33 21 30	9490	35 2 57	9507	36 44 0	9595
	JUPITER	W.	24 41 37	9545	26 21 47	9561	28 1 35	9577	29 41 2	9593
	Spica	E.	22 27 30	9540	20 47 12	9572	19 7 39	9610	17 28 57	9653
	Antares	E.	68 21 49	9999	66 41 6	9949	65 0 51	9953	63 21 5	9953
17	SUN	W.	77 48 56	9939	79 20 25	9958	80 51 31	9976	82 22 14	9994
	VENUS	W.	57 44 54	9945	59 14 11	9963	60 43 6	9981	62 11 39	9999
	Regulus	W.	45 3 20	9610	46 42 2	9696	48 20 21	9643	49 58 18	9653
	JUPITER	W.	37 52 43	9675	39 29 56	9699	41 6 46	9709	42 43 14	9795
	Antares	E.	55 9 15	9967	53 32 17	9708	51 55 48	9799	50 19 47	9751
18	SUN	W.	89 50 16	9981	91 18 49	9997	92 47 2	9114	94 14 55	9129
	VENUS	W.	69 29 1	9185	70 55 28	9209	72 21 35	9218	73 47 93	9223
	Regulus	W.	58 2 36	9738	59 38 25	9753	61 13 55	9768	62 49 5	9792
	JUPITER	W.	50 40 14	9905	52 14 36	9990	53 48 38	9935	55 22 21	9948
	Antares	E.	42 26 58	9994	40 53 53	9998	39 21 19	9913	37 49 17	9939
	α Aquilæ	E.	92 12 0	9157	90 45 0	9179	89 18 17	9186	87 51 53	9203
19	SUN	W.	101 29 44	9904	102 55 49	9917	104 21 38	9930	105 47 12	9949
	VENUS	W.	80 51 53	9307	82 15 56	9381	83 39 43	9334	85 3 15	9347
	Regulus	W.	70 40 20	9949	72 13 44	9999	73 46 51	9974	75 19 43	9996
	JUPITER	W.	63 6 25	9917	64 38 22	9930	66 10 3	9948	67 41 29	9954
	Antares	E.	30 17 51	9993	28 49 33	9131	27 22 1	9174	25 55 21	9291
	α Aquilæ	E.	80 44 33	9994	79 20 3	9301	77 55 53	9319	76 32 4	9337
20	SUN	W.	112 51 21	9909	114 15 30	9913	115 39 27	9923	117 3 12	9939
	VENUS	W.	91 57 22	9406	93 19 32	9416	94 41 30	9427	96 3 16	9436
	Regulus	W.	83 0 27	9939	84 31 56	9949	86 3 13	9958	87 34 19	9966
	JUPITER	W.	75 15 3	9906	76 45 6	9918	78 14 57	9926	79 44 37	9935
	Spica	W.	29 38 18	9978	31 8 58	9994	32 39 31	9990	34 9 56	9996
	α Aquilæ	E.	69 38 10	9431	68 16 29	9451	66 55 10	9472	65 34 15	9494
21	SUN	W.	123 59 16	9376	125 22 0	9385	126 44 34	9393	128 6 59	9400
	VENUS	W.	102 49 35	9479	104 10 23	9487	105 31 2	9493	106 51 34	9500
	Regulus	W.	95 7 11	9905	96 37 17	9912	98 7 15	9918	99 37 5	9925
	JUPITER	W.	87 10 19	9975	88 38 59	9989	90 7 31	9998	91 35 55	9994
	Spica	W.	41 40 11	9995	43 9 53	9930	44 39 29	9935	46 8 58	9940
	α Aquilæ	E.	58 55 56	9614	57 37 37	9643	56 19 49	9672	55 2 32	9709

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## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
21	Fomalhaut E.	96° 8' 51"	3339	94° 45' 25"	3346	93° 22' 7"	3363	91° 56' 57"	3369
22	Regulus W.	101 6 47	3030	102 36 22	3035	104 5 51	3040	105 35 14	3045
	Jupiter W.	93 4 12	3100	94 32 22	3105	96 0 25	3110	97 28 22	3115
	Spica W.	47 38 21	3045	49 7 38	3049	50 36 50	3053	52 5 57	3057
	α Aquilæ E.	53 45 47	3734	52 29 36	3769	51 14 2	3806	49 59 6	3845
	Fomalhaut E.	85 5 2	3394	83 42 39	3401	82 20 24	3409	80 58 18	3417
23	Spica W.	59 30 26	3073	60 59 9	3075	62 27 49	3077	63 56 27	3079
	α Aquilæ E.	43 55 30	4093	42 45 22	4156	41 36 14	4296	40 28 12	4309
	Fomalhaut E.	74 10 4	3459	72 48 54	3468	71 27 54	3478	70 7 5	3488
	α Pegasi E.	88 48 2	3997	87 23 47	3300	85 59 36	3394	84 35 29	3397
24	Spica W.	71 19 6	3085	72 47 34	3085	74 16 2	3086	75 44 29	3086
	Antares W.	26 51 42	3358	28 14 46	3333	29 38 19	3311	31 2 18	3299
	Fomalhaut E.	63 25 57	3545	62 6 23	3560	60 47 5	3575	59 28 3	3590
	α Pegasi E.	77 35 55	3395	76 12 13	3330	74 48 36	3334	73 25 4	3336
25	Spica W.	83 6 48	3093	84 35 18	3099	86 3 50	3099	87 32 24	3079
	Antares W.	38 7 4	3299	39 32 47	3219	40 58 42	3204	42 24 47	3194
	Fomalhaut E.	52 57 32	3688	51 40 32	3719	50 23 58	3740	49 7 53	3768
	α Pegasi E.	66 28 40	3364	65 5 42	3369	63 42 50	3376	62 20 6	3383
26	Spica W.	94 55 42	3099	96 24 29	3097	97 53 19	3094	99 22 13	3091
	Antares W.	49 37 41	3157	51 4 42	3150	52 31 51	3143	53 59 8	3138
	Fomalhaut E.	42 56 1	3963	41 43 45	4016	40 32 21	4073	39 21 53	4138
	α Pegasi E.	55 28 41	3499	54 6 57	3440	52 45 26	3453	51 24 9	3467
	α Arietis E.	98 5 51	3175	96 39 12	3179	95 12 29	3168	93 45 42	3165
27	Antares W.	61 17 20	3108	62 45 20	3109	64 13 27	3096	65 41 41	3091
	α Pegasi E.	44 42 19	3655	43 23 6	3591	42 4 22	3591	40 46 10	3654
	α Arietis E.	86 30 50	3149	85 3 40	3146	83 36 26	3143	82 9 8	3139
28	Antares W.	73 4 36	3093	74 33 32	3056	76 2 36	3050	77 31 47	3043
	α Arietis E.	74 51 41	3194	73 24 0	3191	71 56 16	3118	70 28 28	3114
	Aldebaran E.	107 27 46	2998	105 57 31	2993	104 27 9	2998	102 56 41	2993
29	Antares W.	84 59 37	3013	86 29 34	3005	87 59 40	2999	89 29 54	2993
	α Aquilæ W.	41 25 3	4060	42 35 44	3989	43 47 34	3926	45 0 27	3868
	α Arietis E.	63 8 38	3103	61 40 32	3101	60 12 23	3098	58 44 11	3096
	Aldebaran E.	95 22 38	2954	93 51 27	2947	92 20 8	2940	90 48 40	2934
30	Antares W.	97 3 12	2958	98 34 18	2950	100 5 34	2942	101 36 59	2935
	α Aquilæ W.	51 18 28	3635	52 36 25	3597	53 55 3	3561	55 14 20	3598
	α Arietis E.	51 22 55	3096	49 54 40	3097	48 26 27	3099	46 58 16	3109
	Aldebaran E.	83 9 10	2997	81 36 47	2990	80 4 15	2981	78 31 32	2973
	MARS E.	103 42 19	3109	102 15 24	3153	100 48 19	3144	99 21 3	3136
31	α Aquilæ W.	61 59 22	3385	63 21 56	3360	64 44 58	3337	66 8 27	3313
	α Arietis E.	39 38 46	3137	38 11 21	3150	36 44 12	3166	35 17 22	3184
	Aldebaran E.	70 45 13	2928	69 11 22	2919	67 37 19	2909	66 3 3	2799
	MARS E.	92 1 58	3068	90 33 34	3078	89 4 57	3068	87 36 8	3057
	SUN E.	130 51 22	3199	129 25 3	3180	127 58 30	3169	126 31 44	3158



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
21	Fomalhaut E.	90 35 54	3366	89 12 59	3373	87 50 12	3380	86 27 33	3387
22	Regulus W.	107 4 31	3050	106 33 42	3054	110 2 48	3057	111 31 50	3060
	JUPITER W.	98 56 13	3119	100 23 59	3124	101 51 40	3128	103 19 16	3131
	Spica W.	53 34 59	3061	55 3 56	3065	56 32 49	3067	58 1 39	3069
	α Aquilæ E.	48 44 50	3088	47 31 18	3033	46 18 32	3089	45 6 34	4035
	Fomalhaut E.	79 36 21	3425	78 14 33	3433	76 52 54	3441	75 31 24	3450
23	Spica W.	65 25 2	3081	66 53 35	3082	68 22 7	3083	69 50 37	3084
	α Aquilæ E.	39 21 21	4385	38 15 46	4477	37 11 34	4581	36 8 53	4697
	Fomalhaut E.	68 46 27	3497	67 26 0	3509	66 5 46	3591	64 45 45	3533
	α Pegasi E.	83 11 26	3311	81 47 27	3314	80 23 32	3318	78 59 41	3322
24	Spica W.	77 12 56	3086	78 41 23	3085	80 9 51	3085	81 38 19	3084
	Antares W.	32 26 39	3075	33 51 20	3059	35 16 19	3046	36 41 34	3033
	Fomalhaut E.	58 9 18	3007	56 50 51	3094	55 32 43	3044	54 14 56	3065
	α Pegasi E.	72 1 36	3349	70 38 13	3347	69 14 56	3359	67 51 45	3358
25	Spica W.	89 0 59	3078	90 29 36	3075	91 58 16	3073	93 26 58	3072
	Antares W.	43 51 3	3186	45 17 29	3178	46 44 4	3171	48 10 48	3163
	Fomalhaut E.	47 52 18	3000	46 37 16	3035	45 22 50	3074	44 9 4	3017
	α Pegasi E.	60 57 30	3300	59 35 2	3309	58 12 44	3408	56 50 37	3418
26	Spica W.	100 51 10	3059	102 20 10	3056	103 49 14	3052	105 18 22	3049
	Antares W.	55 26 32	3132	56 54 4	3125	58 21 43	3120	59 49 28	3114
	Fomalhaut E.	38 12 28	4911	37 4 12	4991	35 57 11	4380	34 51 32	4482
	α Pegasi E.	50 3 8	3463	48 42 25	3500	47 22 1	3519	46 1 58	3541
	α Arietis E.	92 18 51	3162	90 51 56	3159	89 24 58	3156	87 57 56	3153
27	Antares W.	67 10 2	3085	68 38 30	3079	70 7 5	3073	71 35 47	3068
	α Pegasi E.	39 28 34	3083	38 11 39	3734	36 55 28	3781	35 40 6	3835
	α Arietis E.	80 41 46	3136	79 14 20	3133	77 46 51	3130	76 19 18	3127
28	Antares W.	79 1 6	3038	80 30 32	3031	82 0 6	3025	83 29 48	3019
	α Arietis E.	69 0 36	3112	67 32 41	3110	66 4 43	3107	64 36 42	3105
	Aldebaran E.	101 26 7	2977	99 55 26	2971	98 24 37	2965	96 53 41	2960
29	Antares W.	91 0 16	2985	92 30 47	2978	94 1 27	2972	95 32 15	2965
	α Aquilæ W.	46 14 19	3814	47 29 7	3765	48 44 46	3718	50 1 14	3675
	α Arietis E.	57 15 57	3096	55 47 42	3096	54 19 27	3095	52 51 11	3085
	Aldebaran E.	89 17 4	2927	87 45 19	2920	86 13 26	2912	84 41 23	2905
30	Antares W.	103 8 34	2927	104 40 18	2920	106 12 12	2912	107 44 16	2903
	α Aquilæ W.	56 34 13	3497	57 54 41	3466	59 15 43	3438	60 37 17	3410
	α Arietis E.	45 30 9	3106	44 2 7	3111	42 34 11	3118	41 6 23	3127
	Aldebaran E.	76 58 39	2965	75 25 35	2955	73 52 19	2947	72 18 52	2936
	Mars E.	97 53 37	3127	96 26 0	3117	94 58 11	3107	93 30 10	3098
31	α Aquilæ W.	67 32 23	3991	68 56 45	3970	70 21 31	3951	71 46 40	3931
	α Arietis E.	33 50 54	3907	32 24 53	3935	30 59 25	3968	29 34 36	3908
	Aldebaran E.	64 28 34	2789	62 53 52	2779	61 18 56	2768	59 43 46	2756
	Mars E.	86 7 6	3046	84 37 50	3035	83 8 21	3024	81 38 38	3013
	Sun E.	125 4 44	3146	123 37 30	3134	122 10 2	3122	120 42 19	3110

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to		Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Subtracted from Apparent Time.				
Sat.	1	<sup>h</sup> 8 <sup>m</sup> 47 <sup>s</sup> 5.19	9.699	N. 17° 55' 41.6"	-38.06	15' 48".11	66.62	<sup>m</sup> 6 <sup>s</sup> 2.31	0.158		
SUN.	2	8 50 57.67	9.675	17 40 19.3	38.79	15 48.24	66.53	5 58.24	0.182		
Mon.	3	8 54 49.55	9.650	17 24 39.7	39.50	15 48.37	66.44	5 53.59	0.207		
Tues.	4	8 58 40.85	9.626	17 8 43.1	-40.31	15 48.50	66.35	5 48.36	0.231		
Wed.	5	9 2 31.58	9.602	16 52 29.8	40.91	15 48.64	66.27	5 42.55	0.255		
Thur.	6	9 6 21.74	9.578	16 36 0.0	41.59	15 48.78	66.18	5 36.18	0.279		
Frid.	7	9 10 11.32	9.553	16 19 14.1	-42.26	15 48.92	66.10	5 29.22	0.303		
Sat.	8	9 14 0.31	9.529	16 2 12.4	42.92	15 49.07	66.01	5 21.67	0.327		
SUN.	9	9 17 48.73	9.505	15 44 55.2	43.56	15 49.22	65.93	5 13.56	0.351		
Mon.	10	9 21 36.59	9.482	15 27 22.8	-44.17	15 49.38	65.84	5 4.88	0.374		
Tues.	11	9 25 23.88	9.458	15 9 35.4	44.78	15 49.55	65.76	4 55.63	0.398		
Wed.	12	9 29 10.60	9.435	14 51 33.7	45.37	15 49.72	65.68	4 45.82	0.421		
Thur.	13	9 32 56.75	9.412	14 33 17.8	-45.96	15 49.90	65.60	4 35.46	0.444		
Frid.	14	9 36 42.35	9.389	14 14 47.9	46.53	15 50.07	65.52	4 24.54	0.467		
Sat.	15	9 40 27.41	9.366	13 56 4.5	47.09	15 50.26	65.44	4 13.07	0.490		
SUN.	16	9 44 11.92	9.344	13 37 7.8	-47.64	15 50.45	65.36	4 1.06	0.512		
Mon.	17	9 47 55.90	9.322	13 17 58.2	48.16	15 50.64	65.29	3 48.52	0.534		
Tues.	18	9 51 39.35	9.301	12 58 36.0	48.68	15 50.84	65.22	3 35.46	0.555		
Wed.	19	9 55 22.29	9.280	12 39 1.5	-49.19	15 51.04	65.15	3 21.88	0.576		
Thur.	20	9 59 4.72	9.259	12 19 15.1	49.68	15 51.24	65.08	3 7.80	0.597		
Frid.	21	10 2 46.67	9.239	11 59 17.0	50.15	15 51.44	65.01	2 53.23	0.617		
Sat.	22	10 6 28.15	9.219	11 39 7.6	-50.62	15 51.65	64.95	2 38.20	0.637		
SUN.	23	10 10 9.18	9.199	11 18 47.1	51.08	15 51.85	64.88	2 22.71	0.656		
Mon.	24	10 13 49.76	9.181	10 58 15.9	51.52	15 52.06	64.82	2 6.79	0.674		
Tues.	25	10 17 29.91	9.164	10 37 34.2	-51.95	15 52.27	64.76	1 50.43	0.691		
Wed.	26	10 21 9.67	9.148	10 16 42.3	52.37	15 52.49	64.70	1 33.68	0.707		
Thur.	27	10 24 49.05	9.133	9 55 40.7	52.77	15 52.70	64.64	1 16.55	0.722		
Frid.	28	10 28 28.07	9.118	9 34 29.6	-53.16	15 52.92	64.59	0 59.06	0.737		
Sat.	29	10 32 6.74	9.104	9 13 9.3	53.53	15 53.14	64.54	0 41.23	0.751		
SUN.	30	10 35 45.08	9.091	8 51 40.1	53.90	15 53.36	64.49	0 23.08	0.764		
Mon.	31	10 39 23.11	9.079	8 30 2.3	54.25	15 53.58	64.44	0 4.61	0.776		
Tues.	32	10 43 0.85	9.067	N. 8 8 16.2	-54.59	15 53.81	64.40	0 14.15	0.788		

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.  
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apperent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
						Added to Mean Time.		
Sat.	1	<sup>h</sup> 8 <sup>m</sup> 47 <sup>s</sup> 4.21	9.699	N. 17° 55' 45.5"	-38.06	<sup>m</sup> 6 <sup>s</sup> 2.32	0.158	<sup>h</sup> 8 <sup>m</sup> 41 <sup>s</sup> 1.89
Sun.	2	8 50 56.70	9.675	17 40 23.2	38.79	5 58.25	0.182	8 44 58.45
Mon.	3	8 54 48.60	9.650	17 24 43.6	39.50	5 53.60	0.207	8 48 55.00
Tues.	4	8 58 39.92	9.626	17 8 47.0	-40.21	5 48.37	0.231	8 52 51.55
Wed.	5	9 2 30.67	9.602	16 52 33.7	40.91	5 42.57	0.255	8 56 48.10
Thur.	6	9 6 20.85	9.578	16 36 3.9	41.59	5 36.20	0.279	9 0 44.65
Frid.	7	9 10 10.45	9.554	16 19 18.0	-42.26	5 29.24	0.303	9 4 41.21
Sat.	8	9 13 59.46	9.530	16 2 16.2	42.92	5 21.70	0.327	9 8 37.76
Sun.	9	9 17 47.90	9.506	15 44 59.0	43.56	5 13.59	0.351	9 12 34.31
Mon.	10	9 21 35.78	9.483	15 27 26.5	-44.17	5 4.91	0.374	9 16 30.87
Tues.	11	9 25 23.09	9.459	15 9 39.1	44.78	4 55.66	0.398	9 20 27.43
Wed.	12	9 29 9.84	9.436	14 51 37.3	45.37	4 45.85	0.421	9 24 23.99
Thur.	13	9 32 56.03	9.413	14 33 21.3	-45.96	4 35.49	0.444	9 28 20.54
Frid.	14	9 36 41.66	9.390	14 14 51.3	46.53	4 24.57	0.467	9 32 17.09
Sat.	15	9 40 26.75	9.367	13 56 7.8	47.09	4 13.10	0.490	9 36 13.65
Sun.	16	9 44 11.29	9.345	13 37 11.1	-47.64	4 1.09	0.512	9 40 10.20
Mon.	17	9 47 55.30	9.323	13 18 1.3	48.17	3 48 55	0.534	9 44 6.75
Tues.	18	9 51 38.79	9.302	12 58 38.9	48.69	3 35.49	0.555	9 48 3.30
Wed.	19	9 55 21.77	9.281	12 39 4.3	-49.20	3 21.91	0.576	9 51 59.86
Thur.	20	9 59 4.24	9.260	12 19 17.7	49.69	3 7.83	0.597	9 55 56.41
Frid.	21	10 2 46.23	9.240	11 59 19.4	50.16	2 53.26	0.617	9 59 52.97
Sat.	22	10 6 27.75	9.220	11 39 9.8	-50.63	2 38.23	0.637	10 3 49.52
Sun.	23	10 10 8.82	9.201	11 18 49.1	51.09	2 22.74	0.656	10 7 46.08
Mon.	24	10 13 49.44	9.183	10 58 17.7	51.53	2 6.81	0.674	10 11 42.63
Tues.	25	10 17 29.63	9.166	10 37 35.8	-51.96	1 50.45	0.691	10 15 39.18
Wed.	26	10 21 9.43	9.150	10 16 43.7	52.38	1 33.70	0.707	10 19 35.73
Thur.	27	10 24 48.85	9.135	9 55 41.9	52.78	1 16.57	0.722	10 23 32.28
Frid.	28	10 28 27.91	9.120	9 34 30.5	-53.17	0 59.08	0.737	10 27 28.83
Sat.	29	10 32 6.63	9.106	9 13 9.9	53.54	0 41.24	0.751	10 31 25.39
Sun.	30	10 35 45.02	9.093	8 51 40.5	53.91	0 23.08	0.764	10 35 21.94
Mon.	31	10 39 23.10	9.081	8 30 2.4	54.26	0 4.61	0.776	10 39 18.49
Tues.	32	10 43 0.89	9.069	N. 8 8 16.0	-54.60	0 14.15	0.788	10 43 15.04

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+ 94.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	213	129° 20' 1.6"	19° 31.7'	143.56	+ 0.09	0.0063145	- 23.4	15 <sup>h</sup> 16 <sup>m</sup> 27.56 <sup>s</sup>
2	214	130 17 27.7	16 57.7	143.61	- 0.03	0.0062575	24.1	15 12 31.65
3	215	131 14 55.1	14 25.0	143.66	0.14	0.0061988	24.8	15 8 35.75
4	216	132 12 23.8	11 53.5	143.72	- 0.23	0.0061383	- 25.6	15 4 39.84
5	217	133 9 53.7	9 23.3	143.77	0.29	0.0060759	26.4	15 0 43.93
6	218	134 7 24.9	6 54.4	143.83	0.31	0.0060115	27.3	14 56 48.02
7	219	135 4 57.4	4 26.8	143.88	- 0.30	0.0059449	- 28.2	14 52 52.11
8	220	136 2 31.2	2 0.5	143.94	0.27	0.0058761	29.1	14 48 56.20
9	221	136 60 6.3	59 35.5	143.99	0.21	0.0058051	30.0	14 45 0.29
10	222	137 57 42.7	57 11.7	144.04	- 0.13	0.0057319	- 31.0	14 41 4.37
11	223	138 55 20.3	54 49.1	144.09	- 0.02	0.0056564	32.0	14 37 8.47
12	224	139 52 59.0	52 27.7	144.14	+ 0.11	0.0055786	32.9	14 33 12.56
13	225	140 50 38.8	50 7.4	144.19	+ 0.24	0.0054987	- 33.8	14 29 16.65
14	226	141 48 19.7	47 48.2	144.23	0.37	0.0054167	34.6	14 25 20.74
15	227	142 46 1.7	45 30.1	144.28	0.50	0.0053326	35.4	14 21 24.84
16	228	143 43 44.8	43 13.1	144.32	+ 0.61	0.0052466	- 36.2	14 17 28.93
17	229	144 41 29.0	40 57.2	144.37	0.70	0.0051589	36.9	14 13 33.02
18	230	145 39 14.3	38 42.4	144.41	0.76	0.0050696	37.5	14 9 37.12
19	231	146 37 0.7	36 28.7	144.45	+ 0.80	0.0049788	- 38.1	14 5 41.21
20	232	147 34 48.2	34 16.1	144.50	0.81	0.0048867	38.6	14 1 45.31
21	233	148 32 36.9	32 4.6	144.55	0.80	0.0047935	39.1	13 57 49.40
22	234	149 30 26.9	29 54.5	144.61	+ 0.76	0.0046992	- 39.5	13 53 53.49
23	235	150 28 18.2	27 45.8	144.66	0.67	0.0046042	39.9	13 49 57.58
24	236	151 26 10.9	25 38.4	144.72	0.57	0.0045083	40.2	13 46 1.67
25	237	152 24 4.9	23 32.3	144.78	+ 0.44	0.0044115	- 40.5	13 42 5.76
26	238	153 22 0.5	21 27.8	144.85	0.31	0.0043142	40.7	13 38 9.86
27	239	154 19 57.8	19 25.0	144.92	0.18	0.0042161	41.0	13 34 13.96
28	240	155 17 56.9	17 24.0	145.00	+ 0.04	0.0041173	- 41.3	13 30 18.05
29	241	156 15 57.8	15 24.8	145.07	- 0.10	0.0040177	41.6	13 26 22.14
30	242	157 14 0.5	13 27.4	145.15	0.21	0.0039174	42.0	13 22 26.24
31	243	158 12 5.0	11 31.8	145.23	0.31	0.0038163	42.4	13 18 30.34
32	244	159 10 11.5	9 38.2	145.31	- 0.37	0.0037141	- 42.8	13 14 34.43
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> .0.								
								Diff. for 1 Hour, — 9 <sup>m</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	15' 20.4	15' 25.7	56' 11.0	+ 1.56	56' 30.4	+ 1.67	<sup>h</sup> 16 <sup>m</sup> 28.9	<sup>m</sup> 1.96	<sup>d</sup> 20.3
2	15 31.3	15 37.2	56 51.0	1.77	57 12.7	1.85	17 17.1	2.06	21.3
3	15 43.4	15 49.8	57 35.4	1.92	57 58.9	1.97	18 8.0	2.19	22.3
4	15 56.3	16 2.8	58 22.9	+ 2.00	58 46.9	+ 1.98	19 2.0	2.32	23.3
5	16 9.3	16 15.5	59 10.6	1.94	59 33.5	1.85	19 59.3	2.45	24.3
6	16 21.4	16 26.7	59 55.0	1.71	60 14.5	1.52	20 59.1	2.53	25.3
7	16 31.3	16 35.0	60 31.4	+ 1.28	60 45.2	+ 1.00	22 0.3	2.56	26.3
8	16 37.8	16 39.5	60 55.4	+ 0.67	61 1.4	+ 0.32	23 1.2	2.51	27.3
9	16 39.9	16 39.1	61 3.0	- 0.06	61 0.0	- 0.44	δ		28.3
10	16 37.0	16 33.8	60 52.5	- 0.81	60 40.6	- 1.16	0 0.6	2.42	0.0
11	16 29.4	16 24.1	60 24.6	1.48	60 5.0	1.76	0 57.4	2.31	1.0
12	16 17.9	16 11.1	59 42.4	1.99	59 17.4	2.16	1 51.6	2.20	2.0
13	16 3.9	15 56.3	58 50.7	- 2.27	58 23.0	- 2.33	2 43.4	2.12	3.0
14	15 48.6	15 41.0	57 54.8	2.31	57 26.8	2.31	3 33.3	2.05	4.0
15	15 33.6	15 26.5	56 59.5	2.23	56 33.4	2.11	4 22.0	2.01	5.0
16	15 19.8	15 13.6	56 8.8	- 1.97	55 46.1	- 1.81	5 10.5	1.99	6.0
17	15 8.0	15 3.0	55 25.4	1.63	55 7.0	1.44	5 57.7	1.98	7.0
18	14 58.6	14 54.8	54 50.9	1.24	54 37.2	1.03	6 45.3	1.98	8.0
19	14 51.8	14 49.4	54 26.0	- 0.83	54 17.1	- 0.64	7 32.9	1.98	9.0
20	14 47.6	14 46.4	54 10.6	0.45	54 6.3	- 0.27	8 20.4	1.97	10.0
21	14 45.9	14 45.9	54 4.2	- 0.09	54 4.2	+ 0.07	9 7.6	1.96	11.0
22	14 46.4	14 47.3	54 6.0	+ 0.22	54 9.5	+ 0.35	9 54.3	1.93	12.0
23	14 48.7	14 50.5	54 14.6	0.48	54 21.2	0.60	10 40.5	1.91	13.0
24	14 52.6	14 55.1	54 29.1	0.70	54 38.1	0.79	11 26.0	1.89	14.0
25	14 57.8	15 0.8	54 48.2	+ 0.87	54 59.2	+ 0.95	12 11.1	1.87	15.0
26	15 4.1	15 7.5	55 11.1	1.02	55 23.6	1.07	12 56.1	1.88	16.0
27	15 11.1	15 14.9	55 36.9	1.12	55 50.8	1.17	13 41.4	1.90	17.0
28	15 18.8	15 22.9	56 5.2	+ 1.22	56 20.2	+ 1.27	14 27.5	1.95	18.0
29	15 27.1	15 31.5	56 35.8	1.32	56 51.9	1.36	15 15.0	2.02	19.0
30	15 36.0	15 40.6	57 8.4	1.39	57 25.4	1.42	16 4.6	2.12	20.0
31	15 45.4	15 50.1	57 42.7	1.45	58 0.3	1.47	16 56.6	2.22	21.0
32	15 55.0	15 59.8	58 18.1	+ 1.47	58 35.7	+ 1.46	17 51.3	2.33	22.0

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 1.					MONDAY 3.				
0	0 38 58.63	2.0307	N. 2 52' 18.4"	9.897	0	2 19 30.34	2.1852	N. 10 26' 26.7"	8.706
1	0 40 59.94	2.0320	3 2 11.5	9.898	1	2 21 41.59	2.1897	10 35 7.7	8.690
2	0 43 1.39	2.0354	3 12 4.3	9.877	2	2 23 53.11	2.1943	10 43 45.9	8.612
3	0 45 2.99	2.0378	3 21 56.7	9.870	3	2 26 4.91	2.1989	10 52 21.2	8.564
4	0 47 4.73	2.0303	3 31 48.7	9.892	4	2 28 16.98	2.2034	11 0 53.6	8.514
5	0 49 6.63	2.0399	3 41 40.1	9.853	5	2 30 29.32	2.2079	11 9 22.9	8.463
6	0 51 8.68	2.0354	3 51 31.0	9.843	6	2 32 41.93	2.2125	11 17 49.1	8.411
7	0 53 10.88	2.0380	4 1 21.3	9.834	7	2 34 54.82	2.2172	11 26 12.2	8.359
8	0 55 13.24	2.0407	4 11 11.1	9.894	8	2 37 8.00	2.2220	11 34 32.2	8.306
9	0 57 15.77	2.0435	4 21 0.2	9.812	9	2 39 21.46	2.2267	11 42 48.9	8.250
10	0 59 18.46	2.0463	4 30 48.5	9.799	10	2 41 35.20	2.2314	11 51 2.2	8.194
11	1 1 21.32	2.0491	4 40 36.1	9.786	11	2 43 49.23	2.2362	11 59 12.2	8.138
12	1 3 24.35	2.0519	4 50 22.9	9.772	12	2 46 3.55	2.2410	12 7 18.8	8.081
13	1 5 27.55	2.0548	5 0 8.8	9.757	13	2 48 18.15	2.2458	12 15 21.9	8.022
14	1 7 30.93	2.0578	5 9 53.8	9.742	14	2 50 33.05	2.2507	12 23 21.4	7.968
15	1 9 34.49	2.0608	5 19 37.9	9.727	15	2 52 48.24	2.2556	12 31 17.3	7.901
16	1 11 38.23	2.0638	5 29 21.0	9.709	16	2 55 3.72	2.2605	12 39 9.5	7.839
17	1 13 42.15	2.0669	5 39 3.0	9.691	17	2 57 19.50	2.2655	12 46 58.0	7.776
18	1 15 46.26	2.0701	5 48 43.9	9.672	18	2 59 35.58	2.2704	12 54 42.6	7.712
19	1 17 50.56	2.0733	5 58 23.7	9.653	19	3 1 51.95	2.2753	13 2 23.4	7.648
20	1 19 55.06	2.0766	6 8 2.3	9.632	20	3 4 8.62	2.2803	13 10 0.3	7.586
21	1 21 59.75	2.0798	6 17 39.6	9.611	21	3 6 25.59	2.2853	13 17 33.2	7.514
22	1 24 4.64	2.0830	6 27 15.6	9.589	22	3 8 42.86	2.2903	13 25 2.0	7.445
23	1 26 9.73	2.0866	N. 6 36 50.3	9.567	23	3 11 0.43	2.2954	N. 13 32 26.6	7.375
SUNDAY 2.					TUESDAY 4.				
0	1 28 15.03	2.0900	N. 6 46 23.6	9.543	0	3 13 18.31	2.3005	N. 13 39 47.0	7.305
1	1 30 20.53	2.0934	6 55 55.4	9.518	1	3 15 36.49	2.3055	13 47 3.2	7.234
2	1 32 26.24	2.0970	7 5 25.7	9.493	2	3 17 54.97	2.3105	13 54 15.1	7.162
3	1 34 32.17	2.1006	7 14 54.5	9.467	3	3 20 13.75	2.3156	14 1 22.6	7.088
4	1 36 38.31	2.1042	7 24 21.7	9.440	4	3 22 32.84	2.3207	14 8 25.6	7.013
5	1 38 44.67	2.1078	7 33 47.3	9.412	5	3 24 52.24	2.3258	14 15 24.1	6.938
6	1 40 51.25	2.1115	7 43 11.2	9.383	6	3 27 11.94	2.3309	14 22 18.1	6.861
7	1 42 58.05	2.1153	7 52 33.3	9.353	7	3 29 31.95	2.3360	14 29 7.4	6.782
8	1 45 5.08	2.1191	8 1 53.6	9.322	8	3 31 52.26	2.3411	14 35 52.0	6.703
9	1 47 12.33	2.1228	8 11 12.0	9.291	9	3 34 12.88	2.3462	14 42 31.8	6.623
10	1 49 19.82	2.1267	8 20 28.5	9.258	10	3 36 33.81	2.3513	14 49 6.7	6.542
11	1 51 27.54	2.1307	8 29 43.0	9.225	11	3 38 55.04	2.3564	14 55 36.8	6.460
12	1 53 35.50	2.1347	8 38 55.5	9.191	12	3 41 16.58	2.3616	15 2 1.9	6.377
13	1 55 43.70	2.1387	8 48 5.9	9.155	13	3 43 38.43	2.3667	15 8 22.0	6.293
14	1 57 52.14	2.1427	8 57 14.1	9.119	14	3 46 0.58	2.3717	15 14 37.0	6.207
15	2 0 0.82	2.1468	9 6 20.2	9.083	15	3 48 23.04	2.3768	15 20 46.8	6.119
16	2 2 9.75	2.1509	9 15 24.1	9.045	16	3 50 45.80	2.3819	15 26 51.3	6.031
17	2 4 18.93	2.1551	9 24 25.6	9.005	17	3 53 8.87	2.3870	15 32 50.5	5.942
18	2 6 28.36	2.1593	9 33 24.7	8.965	18	3 55 32.24	2.3920	15 38 44.4	5.853
19	2 8 38.04	2.1635	9 42 21.4	8.925	19	3 57 55.91	2.3971	15 44 32.9	5.762
20	2 10 47.98	2.1678	9 51 15.7	8.883	20	4 0 19.89	2.4022	15 50 15.9	5.671
21	2 12 58.18	2.1722	10 0 7.4	8.840	21	4 2 44.17	2.4072	15 55 53.4	5.578
22	2 15 8.64	2.1765	10 8 56.5	8.797	22	4 5 8.75	2.4122	16 1 25.3	5.483
23	2 17 19.36	2.1808	10 17 43.0	8.753	23	4 7 33.63	2.4171	16 6 51.4	5.388
24	2 19 30.34	2.1852	N. 10 26 26.7	8.706	24	4 9 58.80	2.4220	N. 16 12 11.8	5.292

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 5.					FRIDAY 7.				
0	h m s	"	N. 16° 12' 11.8"	5.392	0	h m s	"	N. 18° 17' 46.8"	0.347
1	4 9 58.80	2.4320	16 17 26.4	5.185	1	6 13 41.76	2.5004	18 17 22.0	0.479
2	4 12 24.27	2.4309	16 22 35.2	5.097	2	6 16 17.89	2.5039	18 16 49.3	0.619
3	4 14 50.03	2.4318	16 27 38.0	4.997	3	6 18 54.11	2.5045	18 16 8.6	0.744
4	4 17 16.09	2.4367	16 32 34.8	4.897	4	6 21 30.43	2.5061	18 15 20.0	0.877
5	4 19 42.44	2.4416	16 37 25.6	4.796	5	6 24 6.84	2.5074	18 14 23.4	1.009
6	4 22 9.08	2.4464	16 42 10.3	4.693	6	6 26 43.32	2.5087	18 13 18.9	1.143
7	4 24 36.01	2.4512	16 46 48.8	4.590	7	6 29 19.88	2.5099	18 12 6.4	1.275
8	4 27 3.22	2.4559	16 51 21.1	4.486	8	6 31 56.51	2.5111	18 10 45.9	1.408
9	4 29 30.72	2.4606	16 55 47.1	4.380	9	6 34 33.21	2.5122	18 9 17.5	1.541
10	4 31 58.50	2.4653	17 0 6.7	4.273	10	6 37 9.97	2.5130	18 7 41.0	1.674
11	4 34 26.55	2.4698	17 4 19.9	4.166	11	6 39 46.77	2.5138	18 5 56.6	1.807
12	4 36 54.88	2.4745	17 8 26.6	4.058	12	6 42 23.62	2.5145	18 4 4.2	1.940
13	4 39 23.49	2.4791	17 12 26.8	3.949	13	6 45 0.51	2.5151	18 2 3.8	2.073
14	4 41 52.37	2.4836	17 16 20.5	3.839	14	6 47 37.43	2.5156	17 59 55.5	2.206
15	4 44 21.52	2.4880	17 20 7.5	3.727	15	6 50 14.38	2.5160	17 57 39.2	2.337
16	4 46 50.93	2.4924	17 23 47.8	3.616	16	6 52 51.35	2.5168	17 55 15.0	2.470
17	4 49 20.61	2.4967	17 27 21.4	3.503	17	6 55 28.33	2.5164	17 52 42.8	2.602
18	4 51 50.54	2.5010	17 30 48.2	3.390	18	6 58 5.32	2.5165	17 50 2.7	2.734
19	4 54 20.73	2.5053	17 34 8.2	3.276	19	7 0 42.31	2.5165	17 47 14.7	2.866
20	4 56 51.18	2.5095	17 37 21.3	3.160	20	7 3 19.30	2.5164	17 44 18.8	2.997
21	4 59 21.87	2.5136	17 40 27.4	3.043	21	7 5 56.28	2.5169	17 41 15.0	3.128
22	5 1 52.81	2.5177	17 43 26.4	2.925	22	7 8 33.24	2.5158	17 38 3.4	3.259
23	5 4 23.99	2.5217	N. 17° 46' 18.4"	2.807	23	7 11 10.18	2.5154	N. 17° 34' 43.9"	3.390
24	5 6 55.41	2.5257							
THURSDAY 6.					SATURDAY 8.				
0	h m s	"	N. 17° 49' 3.3"	2.689	0	7 13 47.09	2.5148	N. 17° 31' 16.6"	3.520
1	5 9 27.07	2.5296	17 51 41.1	2.570	1	7 16 23.96	2.5149	17 27 41.5	3.649
2	5 11 58.96	2.5333	17 54 11.7	2.449	2	7 19 0.80	2.5136	17 23 58.7	3.778
3	5 14 31.07	2.5371	17 56 35.0	2.328	3	7 21 37.59	2.5128	17 20 8.1	3.907
4	5 17 3.41	2.5408	17 58 51.1	2.207	4	7 24 14.33	2.5118	17 16 9.8	4.035
5	5 19 35.97	2.5444	18 0 59.9	2.085	5	7 26 51.01	2.5108	17 12 3.9	4.162
6	5 22 8.74	2.5479	18 3 1.3	1.962	6	7 29 27.63	2.5097	17 7 50.4	4.288
7	5 24 41.72	2.5511	18 4 55.3	1.838	7	7 32 4.18	2.5085	17 3 29.3	4.415
8	5 27 14.91	2.5548	18 6 41.8	1.713	8	7 34 40.65	2.5073	16 59 0.6	4.543
9	5 29 48.30	2.5581	18 8 20.9	1.589	9	7 37 17.04	2.5058	16 54 24.3	4.667
10	5 32 21.88	2.5613	18 9 52.5	1.463	10	7 39 53.35	2.5044	16 49 40.6	4.790
11	5 34 55.65	2.5644	18 11 16.5	1.337	11	7 42 29.57	2.5028	16 44 49.5	4.914
12	5 37 29.61	2.5676	18 12 32.9	1.210	12	7 45 5.69	2.5019	16 39 50.9	5.037
13	5 40 3.76	2.5708	18 13 41.7	1.082	13	7 47 41.71	2.5004	16 34 45.0	5.159
14	5 42 38.08	2.5734	18 14 42.8	0.954	14	7 50 17.62	2.5076	16 29 31.8	5.280
15	5 45 12.57	2.5763	18 15 36.2	0.826	15	7 52 53.42	2.5057	16 24 11.4	5.401
16	5 47 47.23	2.5790	18 16 21.9	0.697	16	7 55 29.10	2.5036	16 18 43.7	5.521
17	5 50 22.05	2.5816	18 16 59.9	0.568	17	7 58 4.65	2.5015	16 13 8.9	5.639
18	5 52 57.02	2.5842	18 17 30.1	0.438	18	8 0 40.08	2.5003	16 7 27.0	5.757
19	5 55 32.15	2.5867	18 17 52.5	0.308	19	8 3 15.37	2.5071	16 1 38.0	5.875
20	5 58 7.42	2.5890	18 18 7.1	0.177	20	8 5 50.53	2.5048	15 55 42.0	5.991
21	6 0 42.83	2.5913	18 18 13.8	+ 0.047	21	8 8 25.55	2.5024	15 49 39.1	6.105
22	6 3 18.37	2.5934	18 18 12.7	- 0.084	22	8 11 0.42	2.5000	15 43 29.4	6.218
23	6 5 54.04	2.5955	18 18 3.7	0.916	23	8 13 35.14	2.5073	15 37 12.9	6.331
24	6 8 29.83	2.5975	N. 18° 17' 46.8"	0.347	24	8 16 9.70	2.5047	N. 15° 30' 49.6"	6.444
25	6 11 5.74	2.5994							

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 9.					TUESDAY 11.				
0	h m s	s	N. 15° 30' 49.6"	6.444	0	h m s	s	N. 8° 35' 52.3"	10.316
1	8 16 9.70	2.5747	15 24 19.6	6.556	1	10 15 42.95	2.3046	8 25 32.0	10.361
2	8 18 44.10	2.5790	15 17 42.9	6.668	2	10 18 6.50	2.3003	8 15 9.0	10.406
3	8 21 18.34	2.5809	15 10 59.7	6.774	3	10 20 29.79	2.3061	8 4 43.3	10.449
4	8 23 52.41	2.5864	15 4 10.0	6.882	4	10 22 52.83	2.3019	7 54 15.1	10.490
5	8 26 26.31	2.5935	14 57 13.8	6.989	5	10 25 15.61	2.3777	7 43 44.5	10.530
6	8 29 0.03	2.5904	14 50 11.3	7.094	6	10 27 38.15	2.3736	7 33 11.5	10.568
7	8 31 33.56	2.5973	14 43 2.5	7.198	7	10 30 0.44	2.3694	7 22 36.3	10.605
8	8 34 6.91	2.5543	14 35 47.5	7.309	8	10 32 22.48	2.3652	7 11 58.9	10.641
9	8 36 40.08	2.5519	14 28 26.3	7.404	9	10 34 44.27	2.3611	7 1 19.4	10.675
10	8 39 13.06	2.5480	14 20 59.0	7.504	10	10 37 5.81	2.3569	6 50 37.9	10.707
11	8 41 45.84	2.5447	14 13 25.8	7.603	11	10 39 27.10	2.3528	6 39 54.5	10.738
12	8 44 18.42	2.5413	14 5 46.6	7.709	12	10 41 48.15	2.3486	6 29 9.3	10.768
13	8 46 50.80	2.5380	13 58 1.5	7.799	13	10 44 8.96	2.3447	6 18 22.3	10.797
14	8 49 22.98	2.5346	13 50 10.7	7.894	14	10 46 29.52	2.3407	6 7 33.7	10.823
15	8 51 54.95	2.5310	13 42 14.2	7.989	15	10 48 49.84	2.3366	5 56 43.5	10.849
16	8 54 26.70	2.5274	13 34 12.0	8.089	16	10 51 9.91	2.3325	5 45 51.8	10.873
17	8 56 58.24	2.5238	13 26 4.3	8.174	17	10 53 29.74	2.3286	5 34 58.7	10.897
18	8 59 29.56	2.5202	13 17 51.1	8.265	18	10 55 49.34	2.3247	5 24 4.2	10.918
19	9 2 0.67	2.5166	13 9 32.5	8.354	19	10 58 8.70	2.3207	5 13 8.5	10.938
20	9 4 31.56	2.5129	13 1 8.6	8.441	20	11 0 27.82	2.3167	5 2 11.6	10.957
21	9 7 2.22	2.5091	12 52 39.6	8.527	21	11 2 46.71	2.3128	4 51 13.7	10.974
22	9 9 32.65	2.5053	12 44 5.4	8.613	22	11 5 5.36	2.3089	4 40 14.8	10.990
23	9 12 2.86	2.5015	N. 12° 35' 26.1"	8.697	23	11 7 23.77	2.3050	N. 4° 29' 14.9"	11.005
24	9 14 32.83	2.4976			24	11 9 41.96	2.3012		
MONDAY 10.					WEDNESDAY 12.				
0	h m s	s	N. 12° 26' 41.8"	8.779	0	h m s	s	N. 4° 16' 14.2"	11.018
1	9 17 2.57	2.4937	12 17 52.6	8.860	1	11 11 59.92	2.2974	4 7 12.8	11.030
2	9 19 32.08	2.4906	12 8 58.6	8.938	2	11 14 17.65	2.2937	3 56 10.6	11.042
3	9 22 1.35	2.4859	12 0 0.0	9.016	3	11 16 33.16	2.2899	3 45 7.8	11.051
4	9 24 30.38	2.4818	11 50 56.7	9.093	4	11 18 52.44	2.2862	3 34 4.5	11.059
5	9 26 59.17	2.4778	11 41 48.8	9.168	5	11 21 9.50	2.2825	3 23 0.7	11.066
6	9 29 27.72	2.4738	11 32 36.5	9.242	6	11 23 26.34	2.2788	3 11 56.6	11.071
7	9 31 56.03	2.4697	11 23 19.8	9.314	7	11 25 42.96	2.2752	3 0 52.2	11.076
8	9 34 24.09	2.4657	11 13 58.8	9.384	8	11 27 59.37	2.2716	2 49 47.5	11.079
9	9 36 51.91	2.4616	11 4 33.7	9.453	9	11 30 15.56	2.2680	2 38 42.7	11.081
10	9 39 19.48	2.4574	10 55 4.5	9.521	10	11 32 31.53	2.2644	2 27 37.8	11.082
11	9 41 46.80	2.4533	10 45 31.2	9.588	11	11 34 47.20	2.2610	2 16 32.9	11.081
12	9 44 13.87	2.4492	10 35 53.9	9.653	12	11 37 2.85	2.2576	2 5 28.1	11.079
13	9 46 40.70	2.4451	10 26 12.8	9.716	13	11 39 18.20	2.2541	1 54 23.4	11.077
14	9 49 7.28	2.4408	10 16 28.0	9.777	14	11 41 33.34	2.2507	1 43 18.9	11.073
15	9 51 33.60	2.4366	10 6 39.5	9.838	15	11 43 48.28	2.2473	1 32 14.7	11.067
16	9 53 59.67	2.4324	9 56 47.4	9.897	16	11 46 3.02	2.2440	1 21 10.9	11.060
17	9 56 25.49	2.4282	9 46 51.8	9.955	17	11 48 17.56	2.2407	1 10 7.5	11.053
18	9 58 51.06	2.4240	9 36 52.8	10.011	18	11 50 31.91	2.2375	0 59 4.5	11.045
19	10 1 16.37	2.4198	9 26 50.5	10.065	19	11 52 46.06	2.2343	0 48 2.1	11.035
20	10 3 41.43	2.4156	9 16 45.0	10.118	20	11 55 0.02	2.2311	0 37 0.3	11.024
21	10 6 6.24	2.4114	9 6 36.3	10.170	21	11 57 13.79	2.2279	0 25 59.2	11.019
22	10 8 30.80	2.4072	8 56 24.6	10.220	22	11 59 27.37	2.2247	0 14 58.9	10.999
23	10 10 55.10	2.4029	8 46 9.9	10.269	23	12 1 40.76	2.2217	N. 0° 3' 59.4"	10.985
24	10 13 19.15	2.3987	N. 8° 35' 52.3"	10.316	24	12 3 53.97	2.2187	S. 0° 6' 59.3"	10.970
25	10 15 42.95	2.3946				12 6 7.00	2.2157		



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 13.					SATURDAY 15.				
0	12 6 7.00	2.2157	S. 0 6 59.3	10.970	0	13 49 43.46	2.1156	S. 8 18 14.2	9.190
1	12 8 19.85	2.2157	0 17 57.0	10.963	1	13 51 50.36	2.1144	8 27 24.0	9.136
2	12 10 32.52	2.2008	0 28 53.6	10.935	2	13 53 57.19	2.1138	8 36 30.5	9.080
3	12 12 45.02	2.2009	0 39 49.2	10.917	3	13 56 3.94	2.1119	8 45 33.6	9.024
4	12 14 57.35	2.2040	0 50 43.7	10.898	4	13 58 10.62	2.1108	8 54 33.4	8.968
5	12 17 9.50	2.2011	1 1 37.0	10.877	5	14 0 17.24	2.1098	9 3 29.8	8.911
6	12 19 21.48	2.1983	1 12 29.0	10.856	6	14 2 23.80	2.1087	9 12 22.7	8.854
7	12 21 33.29	2.1956	1 23 19.7	10.833	7	14 4 30.29	2.1077	9 21 12.2	8.796
8	12 23 44.95	2.1930	1 34 9.0	10.810	8	14 6 36.72	2.1067	9 29 58.2	8.737
9	12 25 56.45	2.1903	1 44 56.9	10.786	9	14 8 43.09	2.1057	9 38 40.6	8.677
10	12 28 7.79	2.1877	1 55 43.3	10.761	10	14 10 49.41	2.1048	9 47 19.5	8.617
11	12 30 18.97	2.1851	2 6 28.2	10.735	11	14 12 55.67	2.1038	9 55 54.7	8.557
12	12 32 30.00	2.1826	2 17 11.5	10.707	12	14 15 1.87	2.1029	10 4 26.3	8.497
13	12 34 40.88	2.1801	2 27 53.1	10.679	13	14 17 8.02	2.1021	10 12 54.3	8.436
14	12 36 51.61	2.1776	2 38 33.0	10.650	14	14 19 14.12	2.1012	10 21 18.6	8.373
15	12 39 2.19	2.1751	2 49 11.1	10.620	15	14 21 20.17	2.1004	10 29 39.1	8.311
16	12 41 12.62	2.1727	2 59 47.4	10.589	16	14 23 26.17	2.0997	10 37 55.9	8.249
17	12 43 22.91	2.1703	3 10 21.8	10.557	17	14 25 32.13	2.0990	10 46 9.0	8.187
18	12 45 33.06	2.1680	3 20 54.2	10.524	18	14 27 38.05	2.0982	10 54 18.3	8.123
19	12 47 43.07	2.1658	3 31 24.6	10.491	19	14 29 43.92	2.0975	11 2 23.8	8.059
20	12 49 52.95	2.1636	3 41 53.1	10.457	20	14 31 49.75	2.0968	11 10 25.4	7.994
21	12 52 2.70	2.1613	3 52 19.5	10.423	21	14 33 55.54	2.0962	11 18 23.1	7.929
22	12 54 12.31	2.1591	4 2 43.8	10.388	22	14 36 1.29	2.0955	11 26 16.9	7.864
23	12 56 21.79	2.1570	S. 4 13 5.8	10.349	23	14 38 7.00	2.0949	S. 11 34 6.8	7.798
FRIDAY 14.					SUNDAY 16.				
0	12 58 31.15	2.1548	S. 4 23 25.6	10.319	0	14 40 12.68	2.0943	S. 11 41 52.7	7.732
1	13 0 40.38	2.1526	4 33 43.2	10.273	1	14 42 18.32	2.0937	11 49 34.7	7.666
2	13 2 49.49	2.1508	4 43 58.4	10.233	2	14 44 23.93	2.0932	11 57 12.6	7.598
3	13 4 58.48	2.1489	4 54 11.2	10.193	3	14 46 29.51	2.0927	12 4 46.5	7.531
4	13 7 7.36	2.1470	5 4 21.6	10.153	4	14 48 35.05	2.0922	12 12 16.3	7.464
5	13 9 16.12	2.1450	5 14 29.5	10.111	5	14 50 40.57	2.0917	12 19 42.1	7.396
6	13 11 24.76	2.1431	5 24 34.9	10.069	6	14 52 46.06	2.0912	12 27 3.8	7.327
7	13 13 33.29	2.1413	5 34 37.8	10.026	7	14 54 51.52	2.0906	12 34 21.3	7.257
8	13 15 41.72	2.1396	5 44 38.0	9.982	8	14 56 56.96	2.0904	12 41 34.7	7.186
9	13 17 50.04	2.1378	5 54 35.6	9.937	9	14 59 2.37	2.0900	12 48 43.9	7.118
10	13 19 58.26	2.1361	6 4 30.5	9.892	10	15 1 7.76	2.0896	12 55 48.9	7.048
11	13 22 6.37	2.1343	6 14 22.7	9.847	11	15 3 13.13	2.0892	13 2 49.7	6.978
12	13 24 14.38	2.1327	6 24 12.1	9.800	12	15 5 18.47	2.0888	13 9 46.3	6.907
13	13 26 22.29	2.1311	6 33 58.7	9.753	13	15 7 23.79	2.0886	13 16 38.6	6.836
14	13 28 30.11	2.1295	6 43 42.5	9.706	14	15 9 29.10	2.0883	13 23 26.6	6.765
15	13 30 37.83	2.1279	6 53 23.4	9.657	15	15 11 34.39	2.0880	13 30 10.4	6.693
16	13 32 45.46	2.1264	7 3 1.3	9.607	16	15 13 39.66	2.0877	13 36 49.8	6.621
17	13 34 53.00	2.1250	7 12 36.2	9.557	17	15 15 44.91	2.0874	13 43 24.9	6.548
18	13 37 0.46	2.1236	7 22 8.1	9.507	18	15 17 50.15	2.0872	13 49 55.6	6.475
19	13 39 7.83	2.1222	7 31 37.0	9.456	19	15 19 55.37	2.0869	13 56 21.9	6.402
20	13 41 15.12	2.1208	7 41 2.8	9.403	20	15 22 0.58	2.0867	14 2 43.8	6.329
21	13 43 22.32	2.1194	7 50 25.4	9.351	21	15 24 5.78	2.0866	14 9 1.4	6.256
22	13 45 29.44	2.1181	7 59 44.9	9.298	22	15 26 10.97	2.0863	14 15 14.5	6.181
23	13 47 36.49	2.1168	8 9 1.2	9.244	23	15 28 16.14	2.0861	14 21 23.1	6.107
24	13 49 43.46	2.1156	S. 8 18 14.2	9.190	24	15 30 21.30	2.0859	S. 14 27 27.3	6.032

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 17.					WEDNESDAY 19.				
0	15 30 21.30	2.0650	S. 14° 27' 27.3"	6.033	0	17 10 24.62	2.0636	S. 17° 46' 31.8"	2.193
1	15 32 26.45	2.0658	14 33 27.0	5.957	1	17 12 29.63	2.0634	17 48 40.9	2.109
2	15 34 31.60	2.0657	14 39 22.2	5.882	2	17 14 34.63	2.0633	17 50 44.9	2.025
3	15 36 36.74	2.0656	14 45 12.8	5.806	3	17 16 39.62	2.0632	17 52 43.9	1.942
4	15 38 41.87	2.0654	14 50 58.9	5.731	4	17 18 44.61	2.0631	17 54 37.9	1.858
5	15 40 46.99	2.0653	14 56 40.5	5.655	5	17 20 49.59	2.0629	17 56 26.9	1.774
6	15 42 52.10	2.0652	15 2 17.5	5.578	6	17 22 54.56	2.0627	17 58 10.8	1.690
7	15 44 57.21	2.0651	15 7 49.9	5.503	7	17 24 59.52	2.0626	17 59 49.7	1.607
8	15 47 2.31	2.0650	15 13 17.7	5.425	8	17 27 4.47	2.0625	18 1 23.6	1.522
9	15 49 7.41	2.0649	15 18 40.9	5.348	9	17 29 9.42	2.0624	18 2 52.4	1.438
10	15 51 12.50	2.0648	15 23 59.5	5.271	10	17 31 14.36	2.0622	18 4 16.2	1.355
11	15 53 17.59	2.0647	15 29 13.4	5.193	11	17 33 19.28	2.0619	18 5 35.0	1.271
12	15 55 22.67	2.0647	15 34 22.7	5.116	12	17 35 24.19	2.0617	18 6 48.7	1.187
13	15 57 27.75	2.0647	15 39 27.3	5.038	13	17 37 29.09	2.0616	18 7 57.4	1.102
14	15 59 32.83	2.0647	15 44 27.2	4.959	14	17 39 33.98	2.0614	18 9 1.0	1.018
15	16 1 37.91	2.0646	15 49 22.4	4.881	15	17 41 38.85	2.0611	18 9 59.6	0.934
16	16 3 42.98	2.0645	15 54 12.9	4.802	16	17 43 43.71	2.0608	18 10 53.1	0.850
17	16 5 48.05	2.0645	15 58 58.6	4.723	17	17 45 48.55	2.0606	18 11 41.6	0.766
18	16 7 53.12	2.0645	16 3 39.6	4.643	18	17 47 53.38	2.0603	18 12 25.0	0.682
19	16 9 58.19	2.0645	16 8 15.8	4.564	19	17 49 58.19	2.0600	18 13 3.4	0.597
20	16 12 3.26	2.0644	16 12 47.3	4.485	20	17 52 2.98	2.0797	18 13 36.7	0.513
21	16 14 8.32	2.0643	16 17 14.0	4.405	21	17 54 7.76	2.0795	18 14 5.0	0.429
22	16 16 13.38	2.0643	16 21 35.9	4.325	22	17 56 12.52	2.0792	18 14 28.2	0.345
23	16 18 18.44	2.0644	S. 16° 25' 53.0"	4.246	23	17 58 17.26	2.0788	S. 18° 14' 46.4"	0.262
TUESDAY 18.					THURSDAY 20.				
0	16 20 23.51	2.0644	S. 16° 30' 5.4"	4.166	0	18 0 21.98	2.0785	S. 18° 14' 59.6"	0.177
1	16 22 28.57	2.0643	16 34 12.9	4.084	1	18 2 26.68	2.0782	18 15 7.7	0.093
2	16 24 33.63	2.0643	16 38 15.5	4.003	2	18 4 31.36	2.0778	18 15 10.8	- 0.008
3	16 26 38.69	2.0643	16 42 13.3	3.922	3	18 6 36.02	2.0774	18 15 8.8	+ 0.075
4	16 28 43.75	2.0643	16 46 6.2	3.843	4	18 8 40.65	2.0770	18 15 1.8	0.158
5	16 30 48.81	2.0643	16 49 54.3	3.761	5	18 10 45.26	2.0767	18 14 49.8	0.242
6	16 32 53.97	2.0643	16 53 37.5	3.679	6	18 12 49.85	2.0763	18 14 32.8	0.326
7	16 34 58.93	2.0643	16 57 15.8	3.597	7	18 14 54.41	2.0758	18 14 10.7	0.410
8	16 37 3.90	2.0643	17 0 49.2	3.516	8	18 16 58.95	2.0754	18 13 43.6	0.493
9	16 39 9.04	2.0643	17 4 17.7	3.434	9	18 19 3.46	2.0749	18 13 11.5	0.577
10	16 41 14.10	2.0643	17 7 41.3	3.353	10	18 21 7.94	2.0745	18 12 34.4	0.660
11	16 43 19.15	2.0642	17 11 0.0	3.271	11	18 23 12.40	2.0741	18 11 52.3	0.744
12	16 45 24.20	2.0642	17 14 13.8	3.188	12	18 25 16.83	2.0736	18 11 5.1	0.827
13	16 47 29.25	2.0642	17 17 22.6	3.106	13	18 27 21.23	2.0731	18 10 13.0	0.910
14	16 49 34.30	2.0642	17 20 26.5	3.023	14	18 29 25.60	2.0725	18 9 15.9	0.993
15	16 51 39.35	2.0641	17 23 25.4	2.941	15	18 31 29.93	2.0719	18 8 13.8	1.077
16	16 53 44.39	2.0640	17 26 19.4	2.858	16	18 33 34.23	2.0714	18 7 6.7	1.159
17	16 55 49.43	2.0640	17 29 8.4	2.775	17	18 35 38.50	2.0710	18 5 54.7	1.242
18	16 57 54.47	2.0639	17 31 52.4	2.692	18	18 37 42.75	2.0705	18 4 37.7	1.325
19	16 59 59.50	2.0638	17 34 31.4	2.608	19	18 39 46.96	2.0699	18 3 15.7	1.407
20	17 2 4.53	2.0638	17 37 5.4	2.526	20	18 41 51.13	2.0694	18 1 48.8	1.489
21	17 4 9.56	2.0637	17 39 34.5	2.443	21	18 43 55.26	2.0688	18 0 17.0	1.572
22	17 6 14.58	2.0637	17 41 58.6	2.360	22	18 45 59.36	2.0680	17 58 40.2	1.654
23	17 8 19.60	2.0637	17 44 17.7	2.277	23	18 48 3.42	2.0673	17 56 58.5	1.736
24	17 10 24.62	2.0636	S. 17° 46' 31.8"	2.193	24	18 50 7.44	2.0667	S. 17° 55' 11.9"	1.817

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 21.					SUNDAY 23.				
0	18 50 7.44	2.0067	S. 17° 55' 11.9"	1.817	0	20 28 24.05	2.0053	S. 14° 57' 41.1"	5.475
1	18 52 11.42	2.0060	17 53 20.4	1.690	1	20 30 25.54	2.0043	14 52 10.5	5.543
2	18 54 15.36	2.0054	17 51 24.0	1.981	2	20 32 26.97	2.0033	14 46 35.9	5.611
3	18 56 19.27	2.0048	17 49 22.7	2.068	3	20 34 28.34	2.0024	14 40 57.2	5.679
4	18 58 23.14	2.0041	17 47 16.5	2.143	4	20 36 29.66	2.0015	14 35 14.4	5.746
5	19 0 26.96	2.0033	17 45 5.5	2.294	5	20 38 30.92	2.0006	14 29 27.6	5.813
6	19 2 30.74	2.0026	17 42 49.6	2.305	6	20 40 32.12	2.0106	14 23 36.8	5.880
7	19 4 34.48	2.0019	17 40 28.9	2.386	7	20 42 33.26	2.0185	14 17 42.0	5.947
8	19 6 38.17	2.0012	17 38 3.3	2.467	8	20 44 34.34	2.0175	14 11 43.2	6.012
9	19 8 41.82	2.0005	17 35 32.9	2.547	9	20 46 35.36	2.0166	14 5 40.5	6.077
10	19 10 45.43	2.0097	17 32 57.7	2.627	10	20 48 36.33	2.0157	13 59 33.9	6.142
11	19 12 48.90	2.0089	17 30 17.7	2.707	11	20 50 37.24	2.0147	13 53 23.4	6.207
12	19 14 52.50	2.0080	17 27 32.9	2.787	12	20 52 38.09	2.0137	13 47 9.0	6.272
13	19 16 55.97	2.0074	17 24 43.3	2.866	13	20 54 38.89	2.0128	13 40 50.8	6.335
14	19 18 59.39	2.0066	17 21 49.0	2.945	14	20 56 39.63	2.0118	13 34 28.8	6.398
15	19 21 2.76	2.0057	17 18 49.9	3.024	15	20 58 40.31	2.0109	13 28 3.0	6.461
16	19 23 6.08	2.0049	17 15 46.1	3.103	16	21 0 40.94	2.0100	13 21 33.5	6.524
17	19 25 9.35	2.0042	17 12 37.6	3.181	17	21 2 41.51	2.0090	13 15 0.2	6.586
18	19 27 12.58	2.0034	17 9 24.4	3.259	18	21 4 42.02	2.0081	13 8 23.2	6.647
19	19 29 15.76	2.0026	17 6 6.5	3.337	19	21 6 42.48	2.0072	13 1 42.6	6.707
20	19 31 18.88	2.0018	17 2 43.9	3.415	20	21 8 42.89	2.0064	12 54 58.3	6.768
21	19 33 21.95	2.0007	16 59 16.7	3.492	21	21 10 43.25	2.0055	12 48 10.4	6.828
22	19 35 24.97	2.0000	16 55 44.8	3.570	22	21 12 43.55	2.0046	12 41 18.9	6.888
23	19 37 27.94	2.0001	S. 16° 52' 8.3"	3.648	23	21 14 43.80	2.0037	S. 12° 34' 23.8"	6.947
SATURDAY 22.					MONDAY 24.				
0	19 39 30.86	2.0488	S. 16° 48' 27.1"	3.725	0	21 16 44.00	2.0029	S. 12° 27' 25.2"	7.006
1	19 41 33.72	2.0473	16 44 41.3	3.801	1	21 18 44.15	2.0021	12 20 23.1	7.064
2	19 43 36.53	2.0464	16 40 51.0	3.877	2	21 20 44.25	2.0012	12 13 17.5	7.122
3	19 45 39.29	2.0455	16 36 56.1	3.952	3	21 22 44.29	2.0003	12 6 8.4	7.180
4	19 47 41.99	2.0445	16 32 56.7	4.028	4	21 24 44.28	1.9995	11 58 55.9	7.238
5	19 49 44.63	2.0436	16 28 52.7	4.104	5	21 26 44.23	1.9987	11 51 40.1	7.292
6	19 51 47.22	2.0427	16 24 44.2	4.179	6	21 28 44.13	1.9979	11 44 20.9	7.348
7	19 53 49.75	2.0417	16 20 31.2	4.254	7	21 30 43.98	1.9972	11 36 58.3	7.403
8	19 55 52.23	2.0408	16 16 13.7	4.328	8	21 32 43.79	1.9964	11 29 32.5	7.458
9	19 57 54.65	2.0399	16 11 51.8	4.403	9	21 34 43.55	1.9957	11 22 3.4	7.513
10	19 59 57.02	2.0390	16 7 25.4	4.477	10	21 36 43.27	1.9949	11 14 31.0	7.568
11	20 1 59.33	2.0380	16 2 54.6	4.550	11	21 38 42.94	1.9942	11 6 55.4	7.619
12	20 4 1.58	2.0370	15 58 19.4	4.623	12	21 40 42.57	1.9935	10 59 16.7	7.671
13	20 6 3.77	2.0361	15 53 39.8	4.696	13	21 42 42.16	1.9927	10 51 34.9	7.724
14	20 8 5.91	2.0352	15 48 55.9	4.768	14	21 44 41.70	1.9920	10 43 49.9	7.776
15	20 10 7.99	2.0342	15 44 7.6	4.841	15	21 46 41.20	1.9913	10 36 1.8	7.827
16	20 12 10.01	2.0332	15 39 15.0	4.913	16	21 48 40.66	1.9907	10 28 10.7	7.877
17	20 14 11.97	2.0322	15 34 18.1	4.984	17	21 50 40.09	1.9901	10 20 16.6	7.927
18	20 16 13.87	2.0312	15 29 16.9	5.055	18	21 52 39.48	1.9895	10 12 19.4	7.977
19	20 18 15.71	2.0302	15 24 11.5	5.126	19	21 54 38.83	1.9889	10 4 19.3	8.026
20	20 20 17.49	2.0292	15 19 1.8	5.197	20	21 56 38.15	1.9883	9 56 16.3	8.074
21	20 22 19.22	2.0283	15 13 47.9	5.267	21	21 58 37.43	1.9877	9 48 10.4	8.122
22	20 24 20.89	2.0273	15 8 29.8	5.337	22	22 0 36.68	1.9872	9 40 1.7	8.169
23	20 26 22.50	2.0263	15 3 7.5	5.406	23	22 2 35.90	1.9867	9 31 50.2	8.216
24	20 28 24.05	2.0253	S. 14° 57' 41.1"	5.475	24	22 4 35.09	1.9862	S. 9° 23' 35.8"	8.262

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 25.					THURSDAY 27.				
0	22 4 35.09	1.9688	S. 9 23' 35.8"	8.968	0	23 39 47.45	1.9914	S. 2 5' 14.1"	9.759
1	22 6 34.25	1.9687	9 15 18.7	8.967	1	23 41 46.96	1.9923	1 55 28.1	9.774
2	22 8 33.38	1.9686	9 6 58.9	8.966	2	23 43 46.53	1.9932	1 45 41.2	9.789
3	22 10 32.48	1.9647	8 58 36.4	8.966	3	23 45 46.15	1.9942	1 35 53.4	9.803
4	22 12 31.55	1.9643	8 50 11.3	8.440	4	23 47 45.83	1.9951	1 26 4.8	9.816
5	22 14 30.60	1.9640	8 41 43.6	8.444	5	23 49 45.56	1.9960	1 16 15.5	9.827
6	22 16 29.63	1.9636	8 33 13.2	8.527	6	23 51 45.35	1.9971	1 6 25.6	9.838
7	22 18 28.64	1.9632	8 24 40.3	8.569	7	23 53 45.21	1.9982	0 56 35.0	9.849
8	22 20 27.62	1.9628	8 16 4.9	8.610	8	23 55 45.13	1.9993	0 46 43.7	9.860
9	22 22 26.58	1.9625	8 7 27.1	8.651	9	23 57 45.12	2.0004	0 36 51.8	9.869
10	22 24 25.52	1.9622	7 58 46.8	8.692	10	23 59 45.18	2.0016	0 26 59.4	9.878
11	22 26 24.45	1.9620	7 50 4.1	8.733	11	0 1 45.31	2.0028	0 17 6.5	9.886
12	22 28 23.36	1.9618	7 41 19.0	8.771	12	0 3 45.51	2.0040	S. 0 7 13.1	9.893
13	22 30 22.26	1.9616	7 32 31.6	8.809	13	0 5 45.79	2.0053	N. 0 2 40.7	9.899
14	22 32 21.15	1.9613	7 23 41.9	8.847	14	0 7 46.15	2.0067	0 12 34.8	9.904
15	22 34 20.02	1.9611	7 14 49.9	8.885	15	0 9 46.59	2.0080	0 22 29.2	9.909
16	22 36 18.88	1.9610	7 5 55.7	8.922	16	0 11 47.11	2.0093	0 32 23.9	9.913
17	22 38 17.74	1.9609	6 56 59.3	8.958	17	0 13 47.71	2.0107	0 42 18.8	9.917
18	22 40 16.59	1.9608	6 48 0.8	8.993	18	0 15 48.40	2.0122	0 52 14.0	9.921
19	22 42 15.43	1.9607	6 39 0.2	9.028	19	0 17 49.18	2.0137	1 2 9.3	9.926
20	22 44 14.27	1.9607	6 29 57.5	9.063	20	0 19 50.05	2.0153	1 12 4.6	9.932
21	22 46 13.11	1.9607	6 20 52.7	9.097	21	0 21 51.02	2.0169	1 22 0.0	9.937
22	22 48 11.95	1.9607	6 11 45.9	9.139	22	0 23 52.08	2.0185	1 31 55.4	9.942
23	22 50 10.79	1.9606	S. 6 2 37.2	9.182	23	0 25 53.24	2.0202	N. 1 41 50.7	9.941
WEDNESDAY 26.					FRIDAY 28.				
0	22 52 9.64	1.9608	S. 5 53 26.5	9.194	0	0 27 54.50	2.0219	N. 1 51 45.9	9.919
1	22 54 8.49	1.9609	5 44 13.9	9.235	1	0 29 55.87	2.0236	2 1 41.0	9.917
2	22 56 7.35	1.9610	5 34 59.5	9.255	2	0 31 57.34	2.0253	2 11 35.9	9.913
3	22 58 6.21	1.9611	5 25 43.3	9.285	3	0 33 58.91	2.0271	2 21 30.6	9.909
4	23 0 5.08	1.9613	5 16 25.3	9.314	4	0 36 0.59	2.0290	2 31 25.0	9.904
5	23 2 3.97	1.9616	5 7 5.6	9.343	5	0 38 2.39	2.0309	2 41 19.1	9.898
6	23 4 2.87	1.9618	4 57 44.2	9.371	6	0 40 4.30	2.0328	2 51 12.8	9.892
7	23 6 1.78	1.9620	4 48 21.1	9.398	7	0 42 6.33	2.0348	3 1 6.1	9.884
8	23 8 0.71	1.9623	4 38 56.4	9.424	8	0 44 8.48	2.0368	3 10 58.9	9.876
9	23 9 59.66	1.9627	4 29 30.2	9.450	9	0 46 10.75	2.0388	3 20 51.2	9.867
10	23 11 58.63	1.9630	4 20 2.4	9.476	10	0 48 13.14	2.0408	3 30 43.0	9.857
11	23 13 57.62	1.9634	4 10 33.1	9.501	11	0 50 15.65	2.0429	3 40 34.1	9.847
12	23 15 56.64	1.9636	4 1 2.3	9.525	12	0 52 18.29	2.0451	3 50 24.6	9.836
13	23 17 55.68	1.9642	3 51 30.1	9.548	13	0 54 21.06	2.0473	4 0 14.4	9.823
14	23 19 54.75	1.9647	3 41 56.5	9.571	14	0 56 23.97	2.0496	4 10 3.4	9.810
15	23 21 53.85	1.9652	3 32 21.6	9.592	15	0 58 27.01	2.0518	4 19 51.6	9.797
16	23 23 52.98	1.9658	3 22 45.4	9.613	16	1 0 30.19	2.0542	4 29 39.0	9.782
17	23 25 52.15	1.9665	3 13 8.0	9.634	17	1 2 33.51	2.0566	4 39 25.5	9.767
18	23 27 51.36	1.9671	3 3 29.3	9.655	18	1 4 36.97	2.0588	4 49 11.0	9.750
19	23 29 50.60	1.9677	2 53 49.4	9.674	19	1 6 40.57	2.0612	4 58 55.5	9.733
20	23 31 49.88	1.9684	2 44 8.4	9.692	20	1 8 44.32	2.0637	5 8 39.0	9.716
21	23 33 49.21	1.9691	2 34 26.4	9.709	21	1 10 48.22	2.0662	5 18 21.4	9.697
22	23 35 48.58	1.9698	2 24 43.3	9.727	22	1 12 52.27	2.0687	5 28 2.6	9.677
23	23 37 47.99	1.9706	2 14 59.2	9.743	23	1 14 56.47	2.0713	5 37 42.6	9.657
24	23 39 47.45	1.9714	S. 2 5 14.1	9.759	24	1 17 0.83	2.0740	N. 5 47 21.4	9.636

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.																				
SATURDAY 29.					MONDAY 31.																								
0	1 17 0.83	2.0740	N. 5 47' 21.4"	9.636	0	3 0 13.06	2.3375	N. 12 48' 49.0"	7.578																				
1	1 19 5.35	2.0767	5 56 58.9	9.613	1	3 2 27.43	2.3415	12 56 21.7	7.513																				
2	1 21 10.03	2.0793	6 6 35.0	9.590	2	3 4 42.04	2.3456	13 3 50.5	7.447																				
3	1 23 14.87	2.0820	6 16 9.7	9.567	3	3 6 56.90	2.3497	13 11 15.3	7.379																				
4	1 25 19.87	2.0847	6 25 43.0	9.542	4	3 9 12.00	2.3537	13 18 36.0	7.311																				
5	1 27 25.03	2.0874	6 35 14.8	9.517	5	3 11 27.34	2.3577	13 25 52.6	7.242																				
6	1 29 30.36	2.0903	6 44 45.0	9.490	6	3 13 42.92	2.3618	13 33 5.0	7.172																				
7	1 31 35.87	2.0932	6 54 13.6	9.463	7	3 15 58.75	2.3659	13 40 13.2	7.101																				
8	1 33 41.55	2.0962	7 3 40.6	9.436	8	3 18 14.83	2.3700	13 47 17.1	7.028																				
9	1 35 47.41	2.0991	7 13 5.9	9.407	9	3 20 31.15	2.3741	13 54 16.6	6.955																				
10	1 37 53.44	2.1020	7 22 29.4	9.377	10	3 22 47.72	2.3782	14 1 11.7	6.882																				
11	1 39 59.65	2.1051	7 31 51.1	9.346	11	3 25 4.53	2.3823	14 8 2.4	6.808																				
12	1 42 6.05	2.1082	7 41 10.9	9.314	12	3 27 21.59	2.3864	14 14 48.6	6.732																				
13	1 44 12.63	2.1112	7 50 28.8	9.282	13	3 29 38.90	2.3906	14 21 30.2	6.655																				
14	1 46 19.39	2.1143	7 59 44.7	9.249	14	3 31 56.46	2.3947	14 28 7.2	6.577																				
15	1 48 26.34	2.1174	8 8 58.7	9.216	15	3 34 14.26	2.3988	14 34 39.4	6.498																				
16	1 50 33.48	2.1206	8 18 10.6	9.180	16	3 36 32.31	2.4029	14 41 6.9	6.418																				
17	1 52 40.81	2.1238	8 27 20.3	9.144	17	3 38 50.61	2.4071	14 47 29.6	6.338																				
18	1 54 48.34	2.1271	8 36 27.8	9.107	18	3 41 9.16	2.4112	14 53 47.5	6.257																				
19	1 56 56.06	2.1304	8 45 33.1	9.069	19	3 43 27.95	2.4153	15 0 0.5	6.175																				
20	1 59 3.98	2.1337	8 54 36.1	9.031	20	3 45 46.99	2.4194	15 6 8.5	6.091																				
21	2 1 12.10	2.1370	9 3 36.8	8.992	21	3 48 6.28	2.4235	15 12 11.4	6.007																				
22	2 3 20.42	2.1404	9 12 35.1	8.951	22	3 50 25.81	2.4276	15 18 9.3	5.922																				
23	2 5 28.95	2.1438	N. 9 21 30.9	8.909	23	3 52 45.59	2.4317	N. 15 24 2.1	5.837																				
SUNDAY 30.					TUESDAY, SEPTEMBER 1.																								
0	2 7 37.68	2.1472	N. 9 30 24.2	8.867	0	3 55 5.63	2.4358	N. 15 29 49.7	5.750																				
1	2 9 46.62	2.1507	9 39 14.0	8.824	PHASES OF THE MOON.																								
2	2 11 55.77	2.1542	9 48 3.1	8.781																									
3	2 14 5.12	2.1577	9 56 48.6	8.735																									
4	2 16 14.69	2.1612	10 5 31.3	8.689																									
5	2 18 24.47	2.1648	10 14 11.2	8.643	<table><tr><td></td><td>d</td><td>h</td><td>m</td></tr><tr><td>☾ Last Quarter. August</td><td>3</td><td>9</td><td>55.7</td></tr><tr><td>● New Moon . . . .</td><td>10</td><td>0</td><td>13.9</td></tr><tr><td>☾ First Quarter . . . .</td><td>17</td><td>1</td><td>46.8</td></tr><tr><td>○ Full Moon . . . .</td><td>25</td><td>5</td><td>25.2</td></tr></table>						d	h	m	☾ Last Quarter. August	3	9	55.7	● New Moon . . . .	10	0	13.9	☾ First Quarter . . . .	17	1	46.8	○ Full Moon . . . .	25	5	25.2
	d	h	m																										
☾ Last Quarter. August	3	9	55.7																										
● New Moon . . . .	10	0	13.9																										
☾ First Quarter . . . .	17	1	46.8																										
○ Full Moon . . . .	25	5	25.2																										
6	2 20 34.47	2.1685	10 22 48.4	8.596	<table><tr><td></td><td>d</td><td>h</td></tr><tr><td>☾ Perigee. . . August</td><td>8</td><td>22.4</td></tr><tr><td>☾ Apogee. . . . .</td><td>21</td><td>6.0</td></tr></table>						d	h	☾ Perigee. . . August	8	22.4	☾ Apogee. . . . .	21	6.0											
	d	h																											
☾ Perigee. . . August	8	22.4																											
☾ Apogee. . . . .	21	6.0																											
7	2 22 44.69	2.1722	10 31 22.7	8.547																									
8	2 24 55.13	2.1758	10 39 54.0	8.497																									
9	2 27 5.78	2.1794	10 48 22.3	8.447																									
10	2 29 16.66	2.1832	10 56 47.6	8.395																									
11	2 31 27.76	2.1869	11 5 9.7	8.342																									
12	2 33 39.09	2.1907	11 13 28.6	8.288																									
13	2 35 50.65	2.1945	11 21 44.3	8.234																									
14	2 38 2.43	2.1983	11 29 56.7	8.180																									
15	2 40 14.44	2.2021	11 38 5.9	8.125																									
16	2 42 26.68	2.2059	11 46 11.7	8.068																									
17	2 44 39.15	2.2098	11 54 14.0	8.009																									
18	2 46 51.86	2.2137	12 2 12.8	7.950																									
19	2 49 4.80	2.2177	12 10 8.0	7.890																									
20	2 51 17.98	2.2216	12 17 59.6	7.830																									
21	2 53 31.39	2.2255	12 25 47.6	7.769																									
22	2 55 45.04	2.2295	12 33 31.9	7.707																									
23	2 57 58.93	2.2335	12 41 12.4	7.643																									
24	3 0 13.06	2.2375	N. 12 48 49.0	7.578																									

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Aquilæ W.	73 12 12	3212	74 38 7	3193	76 4 25	3175	77 31 4	3158
	Fomalhaut W.	41 53 58	3642	43 11 47	3578	44 30 45	3520	45 50 47	3465
	$\alpha$ Pegasi W.	27 16 44	4173	28 25 36	4081	29 36 55	3887	30 50 28	3769
	Aldebaran E.	58 8 21	2746	56 32 42	2734	54 56 47	2722	53 20 37	2711
	MARS E.	80 8 41	3001	78 38 29	2989	77 8 3	2977	75 37 22	2965
	Pollux E.	101 36 45	2834	100 3 1	2822	98 29 2	2810	96 54 47	2797
2	SUN E.	119 14 21	3007	117 46 8	3084	116 17 39	3071	114 48 54	3059
	$\alpha$ Aquilæ W.	84 49 23	3078	86 18 0	3063	87 46 55	3048	89 16 8	3034
	Fomalhaut W.	52 44 59	3242	54 10 18	3206	55 36 20	3171	57 3 4	3137
	$\alpha$ Pegasi W.	37 24 59	3350	38 48 13	3288	40 12 38	3231	41 38 10	3180
	Aldebaran E.	45 15 46	2849	43 37 57	2836	41 59 51	2822	40 21 26	2809
	MARS E.	67 59 59	2901	66 27 41	2888	64 55 7	2875	63 22 16	2861
3	Pollux E.	88 59 23	2734	87 23 28	2721	85 47 16	2708	84 10 47	2696
	SUN E.	107 21 5	2969	105 50 39	2975	104 19 55	2961	102 48 53	2946
	Fomalhaut W.	64 26 23	2969	65 56 49	2963	67 27 48	2938	68 59 19	2914
	$\alpha$ Pegasi W.	48 59 58	2970	50 30 48	2935	52 2 22	2901	53 34 39	2870
	Aldebaran E.	32 4 40	2536	30 24 20	2525	28 43 41	2510	27 2 42	2495
	MARS E.	55 33 32	2792	53 58 53	2777	52 23 55	2763	50 48 39	2750
4	Pollux E.	76 3 58	2699	74 25 43	2617	72 47 11	2604	71 8 21	2591
	SUN E.	95 8 58	2899	93 36 0	2854	92 2 42	2838	90 29 3	2822
	Fomalhaut W.	76 44 18	2803	78 18 42	2783	79 53 32	2764	81 28 47	2746
	$\alpha$ Pegasi W.	61 25 37	2739	63 1 34	2707	64 38 4	2684	66 15 6	2660
	MARS E.	42 47 44	2681	41 10 39	2669	39 33 17	2656	37 55 38	2643
	Pollux E.	62 40 52	2530	61 9 20	2518	59 26 32	2507	57 47 28	2497
5	SUN E.	82 35 36	2741	80 59 51	2725	79 23 44	2708	77 47 15	2692
	Fomalhaut W.	89 30 53	2603	91 8 23	2649	92 46 12	2635	94 24 19	2622
	$\alpha$ Pegasi W.	74 27 41	2557	76 7 35	2538	77 47 55	2520	79 28 40	2502
	$\alpha$ Arietis W.	31 6 34	2749	32 42 9	2698	34 18 59	2643	35 56 56	2627
	Pollux E.	49 18 44	2453	47 36 24	2448	45 53 57	2443	44 11 24	2441
	SUN E.	69 39 26	2619	68 0 47	2596	66 21 47	2580	64 42 25	2565
6	$\alpha$ Pegasi W.	87 58 12	2426	89 41 9	2413	91 24 25	2401	93 7 58	2390
	$\alpha$ Arietis W.	44 20 31	2424	46 3 32	2396	47 47 12	2371	49 31 28	2348
	Pollux E.	35 38 31	2460	33 56 23	2474	32 14 33	2494	30 33 11	2519
	SUN E.	56 20 26	2423	54 39 3	2479	52 57 20	2466	51 15 19	2453
	$\alpha$ Arietis W.	58 20 36	2252	60 7 46	2237	61 55 19	2222	63 43 14	2206
	Aldebaran W.	24 21 8	2099	26 12 18	2083	28 3 43	2074	29 55 22	2066
7	SUN E.	42 41 0	2398	40 57 22	2389	39 13 31	2380	37 29 28	2373
	$\alpha$ Arietis W.	72 47 15	2158	74 36 46	2151	76 26 28	2145	78 16 19	2139
	Aldebaran W.	39 16 40	2031	41 9 26	2026	43 2 20	2022	44 55 20	2018
	SUN E.	28 46 52	2348	27 2 3	2347	25 17 12	2347	23 32 21	2348
	SUN W.	27 25 6	2545	29 5 16	2550	30 45 8	2573	32 24 40	2588
	Spica E.	34 58 6	2255	33 11 1	2275	31 24 25	2296	29 38 20	2318
12	Antares E.	80 50 55	2277	79 4 22	2294	77 18 14	2311	75 32 30	2328
	SUN W.	40 36 48	2674	42 14 3	2692	43 50 53	2711	45 27 18	2730

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	$\alpha$ Aquilæ W.	78° 58' 4"	3141	80° 25' 24"	3194	81° 53' 4"	3108	83° 21' 4"	3099
	Fomalhaut W.	47 11 50	3415	48 33 50	3368	49 56 43	3394	51 20 27	3299
	$\alpha$ Pegasi W.	32 6 2	3668	33 23 25	3574	34 42 28	3491	36 3 2	3417
	Aldebaran E.	51 44 12	2999	50 7 31	2986	48 30 33	2974	46 53 18	2961
	Mars E.	74 6 25	2959	72 35 12	2940	71 3 44	2927	69 32 0	2914
	Pollux E.	95 20 15	2785	93 45 27	2779	92 10 22	2760	90 35 1	2747
	Sun E.	113 19 54	3045	111 50 37	3039	110 21 4	3018	108 51 13	3004
2	$\alpha$ Aquilæ W.	90 45 38	3099	92 15 24	3008	93 45 27	2996	95 15 45	2984
	Fomalhaut W.	58 30 29	3106	59 58 33	3074	61 27 14	3045	62 56 31	3017
	$\alpha$ Pegasi W.	43 4 43	3133	44 32 13	3067	46 0 38	3046	47 29 54	3007
	Aldebaran E.	38 42 43	2596	37 3 41	2581	35 24 20	2567	33 44 40	2553
	Mars E.	61 49 7	2648	60 15 41	2633	58 41 56	2619	57 7 53	2605
	Pollux E.	82 34 0	2699	80 56 56	2699	79 19 34	2656	77 41 55	2642
	Sun E.	101 17 32	2931	99 45 53	2916	98 13 54	2901	96 41 36	2886
3	Fomalhaut W.	70 31 20	2991	72 3 51	2997	73 36 52	2945	75 10 21	2994
	$\alpha$ Pegasi W.	55 7 36	2941	56 41 11	2911	58 15 24	2784	59 50 13	2757
	Aldebaran E.	25 21 22	2480	23 39 41	2466	21 57 40	2451	20 15 18	2436
	Mars E.	49 13 5	2736	47 37 13	2729	46 1 2	2707	44 24 32	2694
	Pollux E.	69 29 14	2578	67 49 49	2566	66 10 7	2553	64 30 8	2541
	Sun E.	88 55 4	2905	87 20 43	2790	85 46 2	2774	84 11 0	2757
4	Fomalhaut W.	83 4 26	2728	84 40 29	2710	86 16 55	2694	87 53 43	2678
	$\alpha$ Pegasi W.	67 52 39	2636	69 30 42	2617	71 9 14	2626	72 48 14	2577
	Mars E.	36 17 42	2634	34 39 31	2629	33 1 6	2619	31 22 28	2604
	Pollux E.	56 6 10	2487	54 24 38	2477	52 42 52	2468	51 0 54	2460
	Sun E.	76 10 25	2676	74 33 13	2660	72 55 39	2643	71 17 43	2626
5	Fomalhaut W.	96 2 44	2610	97 41 25	2599	99 20 21	2590	100 59 30	2580
	$\alpha$ Pegasi W.	81 9 50	2466	82 51 23	2470	84 33 18	2455	86 15 35	2441
	$\alpha$ Arietis W.	37 35 55	2556	39 15 50	2519	40 56 37	2485	42 38 12	2453
	Pollux E.	42 28 47	2439	40 46 8	2440	39 3 30	2443	37 20 57	2450
	Sun E.	63 2 42	2550	61 22 38	2535	59 42 14	2521	58 1 30	2507
6	$\alpha$ Pegasi W.	94 51 47	2380	96 35 51	2370	98 20 9	2361	100 4 40	2353
	$\alpha$ Arietis W.	51 16 18	2396	53 1 40	2306	54 47 31	2287	56 33 50	2268
	Pollux E.	28 52 24	2553	27 12 24	2597	25 33 25	2654	23 55 44	2736
	Sun E.	49 33 0	2441	47 50 24	2430	46 7 32	2419	44 24 24	2408
7	$\alpha$ Arietis W.	65 31 29	2196	67 20 2	2186	69 8 51	2175	70 57 56	2166
	Aldebaran W.	31 47 14	2057	33 39 19	2050	35 31 36	2043	37 24 3	2037
	Sun E.	35 45 14	2366	34 0 50	2359	32 16 17	2355	30 31 37	2351
8	$\alpha$ Arietis W.	80 6 18	2135	81 56 24	2139	83 46 35	2130	85 36 49	2128
	Aldebaran W.	46 48 26	2015	48 41 36	2013	50 34 50	2019	52 28 6	2011
	Sun E.	21 47 32	2353	20 2 50	2361	18 18 19	2373	16 34 5	2391
12	Sun W.	34 3 51	2604	35 42 40	2621	37 21 6	2638	38 59 9	2656
	Spica E.	27 52 47	2342	26 7 48	2367	24 23 26	2394	22 39 43	2425
	Antares E.	73 47 12	2346	72 2 20	2364	70 17 54	2383	68 33 55	2403
13	Sun W.	47 3 18	2749	48 38 53	2768	50 14 3	2786	51 48 47	2807

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
13	Antares E.	66° 50' 24"	9499	65° 7' 21"	9499	63° 24' 46"	9499	61° 42' 40"	9494
	α Aquilæ E.	114 30 3	9609	112 57 4	9674	111 24 12	9690	109 51 28	9697
14	SUN W.	53 23 6	2996	54 57 0	2946	56 30 28	2996	58 3 31	2985
	VENUS W.	26 7 47	2918	27 39 43	2936	29 11 16	2955	30 42 25	2975
	Antares E.	53 19 38	2593	51 40 33	2616	50 2 0	2640	48 23 59	2664
	α Aquilæ E.	102 10 39	2941	100 39 12	2955	99 8 3	2970	97 37 13	2985
15	SUN W.	65 42 36	3061	67 13 12	3000	68 43 25	3018	70 13 15	3037
	VENUS W.	38 12 8	3070	39 40 54	3090	41 9 16	3108	42 37 16	3127
	Antares E.	40 22 15	2794	38 47 39	2822	37 13 40	2852	35 40 20	2884
	α Aquilæ E.	90 7 57	3069	88 39 9	3067	87 10 43	3105	85 42 39	3134
16	SUN W.	77 36 53	3194	79 4 33	3141	80 31 53	3158	81 58 53	3173
	VENUS W.	49 51 47	3914	51 17 39	3931	52 43 11	3948	54 8 23	3965
	Spica W.	19 54 37	2979	21 27 23	2980	23 0 7	2984	24 32 46	2991
	α Aquilæ E.	78 28 12	3294	77 2 31	3245	75 37 15	3267	74 12 25	3288
17	SUN W.	89 9 23	3246	90 34 38	3250	91 59 37	3272	93 24 21	3285
	VENUS W.	61 9 52	3338	62 33 19	3351	63 56 31	3365	65 19 27	3378
	Spica W.	32 13 42	2931	33 45 21	2941	35 16 48	2950	36 48 4	2959
	α Aquilæ E.	67 14 44	3406	65 52 34	3430	64 30 52	3455	63 9 38	3481
	Fomalhaut E.	99 25 57	3963	98 1 2	3973	96 36 19	3982	95 11 47	3992
18	SUN W.	100 24 31	3340	101 47 56	3351	103 11 9	3369	104 34 12	3389
	VENUS W.	72 10 43	3434	73 32 21	3445	74 53 47	3454	76 15 3	3463
	Spica W.	44 21 35	3001	45 51 46	3009	47 21 48	3017	48 51 40	3024
	α Aquilæ E.	56 31 11	3630	55 13 9	3663	53 55 43	3698	52 38 54	3726
	Fomalhaut E.	88 11 57	3348	86 48 34	3351	85 25 22	3369	84 2 22	3379
19	SUN W.	111 27 4	3405	112 49 15	3411	114 11 19	3417	115 33 16	3423
	VENUS W.	82 59 5	3500	84 19 29	3506	85 39 46	3511	86 59 58	3515
	Spica W.	56 18 56	3054	57 48 2	3069	59 17 2	3083	60 45 57	3099
	Fomalhaut E.	77 10 16	3423	75 48 26	3434	74 26 48	3445	73 5 22	3455
	α Pegasi E.	91 47 58	3278	90 23 21	3284	88 58 51	3299	87 34 27	3294
20	SUN W.	122 21 45	3440	123 43 16	3443	125 4 44	3446	126 26 9	3447
	VENUS W.	93 39 44	3535	94 59 29	3537	96 19 12	3539	97 38 53	3540
	Spica W.	68 9 21	3069	69 37 52	3085	71 6 20	3087	72 34 46	3087
	Antares W.	23 58 10	3440	25 19 41	3404	26 41 53	3373	28 4 40	3346
	Fomalhaut E.	66 21 23	3515	65 1 16	3598	63 41 23	3541	62 21 44	3555
	α Pegasi E.	80 33 55	3319	79 10 5	3394	77 46 21	3398	76 22 42	3333
21	VENUS W.	104 17 4	3549	105 36 42	3549	106 56 20	3540	108 16 0	3538
	Spica W.	79 56 45	3088	81 25 9	3087	82 53 34	3086	84 22 1	3085
	Antares W.	35 5 2	3256	36 30 5	3243	37 55 23	3239	39 20 54	3221
	Fomalhaut E.	55 42 43	3641	54 29 53	3681	53 12 24	3683	51 55 19	3707
	α Pegasi E.	69 25 49	3357	68 2 43	3392	66 39 43	3368	65 16 50	3373
22	Spica W.	91 44 47	3073	93 13 30	3070	94 42 16	3067	96 11 6	3063
	Antares W.	46 31 34	3174	47 58 14	3166	49 25 4	3158	50 52 4	3149
	Fomalhaut E.	45 36 55	3661	44 22 56	3699	43 9 38	3647	41 57 6	3697
	α Pegasi E.	58 24 9	3406	57 2 2	3417	55 40 5	3496	54 18 18	3497



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
13	Antares E.	60 1 4	2504	58 19 57	2506	56 39 20	2548	54 59 14	2570
	α Aquilæ E.	108 18 53	2806	106 46 29	2806	105 14 18	2917	103 42 21	2929
14	SUN W.	59 36 9	2905	61 8 22	2994	62 40 11	2949	64 11 36	2969
	VENUS W.	32 13 9	2994	33 43 29	3013	35 13 26	3039	36 42 59	3059
	Antares E.	46 46 31	2989	45 9 36	2714	43 33 14	2740	41 57 27	2766
	α Aquilæ E.	96 6 42	3001	94 36 30	3017	93 6 38	3034	91 37 7	3051
15	SUN W.	71 42 42	3055	73 11 47	3073	74 40 30	3090	76 8 52	3107
	VENUS W.	44 4 53	3145	45 32 8	3163	46 59 2	3180	48 25 35	3198
	Antares E.	34 7 41	2917	32 35 44	2953	31 4 32	2991	29 34 8	3033
	α Aquilæ E.	84 14 58	3143	82 47 41	3169	81 20 47	3183	79 54 17	3203
16	SUN W.	83 25 35	3188	84 51 58	3203	86 18 4	3218	87 43 52	3239
	VENUS W.	55 33 16	3280	56 57 51	3294	58 22 9	3310	59 46 9	3325
	Spica W.	26 5 17	2998	27 37 39	2905	29 9 51	2914	30 41 52	2923
	α Aquilæ E.	72 48 0	3311	71 24 1	3333	70 0 28	3357	68 37 22	3361
17	SUN W.	94 48 50	3298	96 13 4	3309	97 37 5	3319	99 0 54	3330
	VENUS W.	66 42 9	3390	68 4 37	3401	69 26 52	3413	70 48 54	3424
	Spica W.	38 19 8	2968	39 50 1	2977	41 20 43	2985	42 51 14	2993
	α Aquilæ E.	61 48 53	3509	60 28 39	3538	59 8 57	3567	57 49 47	3598
	Fomalhaut E.	93 47 26	3301	92 23 16	3319	90 59 18	3329	89 35 32	3338
18	SUN W.	105 57 4	3378	107 19 46	3385	108 42 20	3399	110 4 46	3399
	VENUS W.	77 36 9	3471	78 57 6	3479	80 17 54	3487	81 38 33	3493
	Spica W.	50 21 23	3030	51 50 58	3037	53 20 25	3043	54 49 44	3049
	α Aquilæ E.	51 22 45	3775	50 7 17	3817	48 52 32	3860	47 38 32	3908
	Fomalhaut E.	82 39 34	3369	81 16 57	3383	79 54 32	3409	78 32 18	3413
19	SUN W.	116 55 7	3497	118 16 53	3431	119 38 34	3435	121 0 11	3438
	VENUS W.	88 20 5	3590	89 40 7	3585	91 0 4	3599	92 19 56	3533
	Spica W.	62 14 46	3079	63 43 30	3075	65 12 10	3078	66 40 47	3080
	Fomalhaut E.	71 44 8	3467	70 23 7	3479	69 2 19	3490	67 41 44	3503
	α Pegasi E.	86 10 9	3300	84 45 57	3305	83 21 51	3309	81 57 50	3314
20	SUN W.	127 47 32	3448	129 8 54	3449	130 30 15	3450	131 51 35	3450
	VENUS W.	98 58 33	3541	100 18 12	3542	101 37 50	3543	102 57 27	3543
	Spica W.	74 3 11	3068	75 31 35	3069	76 59 58	3069	78 28 21	3068
	Antares W.	29 27 58	3394	30 51 42	3304	32 15 49	3287	33 40 16	3270
	Fomalhaut E.	61 2 21	3570	59 43 14	3587	58 24 25	3603	57 5 54	3629
	α Pegasi E.	74 59 9	3338	73 35 41	3349	72 12 18	3347	70 49 1	3351
21	VENUS W.	109 35 42	3536	110 55 26	3534	112 15 13	3531	113 35 3	3528
	Spica W.	85 50 29	3083	87 18 59	3081	88 47 32	3078	90 16 8	3076
	Antares W.	40 46 38	3910	42 12 35	3900	43 38 44	3191	45 5 4	3183
	Fomalhaut E.	50 38 39	3739	49 22 26	3761	48 6 43	3799	46 51 32	3824
	α Pegasi E.	63 54 3	3379	62 31 23	3386	61 8 50	3393	59 46 25	3400
22	Spica W.	97 40 1	3059	99 9 1	3056	100 38 5	3052	102 7 14	3047
	Antares W.	52 19 14	3149	53 46 33	3134	55 14 1	3127	56 41 38	3119
	Fomalhaut E.	40 45 23	4052	39 34 35	4114	38 24 47	4183	37 16 5	4260
	α Pegasi E.	52 56 43	3448	51 35 21	3462	50 14 14	3476	48 53 23	3492

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
22	$\alpha$ Arietis E.	101° 11' 44"	3183	99° 45' 15"	3179	98° 18' 41"	3174	96° 52' 1"	3170
23	Antares W.	58 9 25	3112	59 37 20	3104	61 5 25	3096	62 33 39	3089
	$\alpha$ Pegasi E.	47 32 50	3510	46 12 37	3509	44 52 45	3551	43 33 17	3576
	$\alpha$ Arietis E.	89 37 22	3148	88 10 10	3143	86 42 52	3138	85 15 28	3133
24	Antares W.	69 57 4	3052	71 26 12	3044	72 55 30	3037	74 24 57	3030
	$\alpha$ Arietis E.	77 57 0	3109	76 29 1	3105	75 0 57	3100	73 32 47	3095
	Aldebaran E.	110 38 32	2984	109 7 59	2978	107 37 19	2972	106 6 31	2965
25	Antares W.	81 54 30	2992	83 24 53	2985	84 55 25	2977	86 26 7	2969
	$\alpha$ Aquilæ W.	39 4 14	4180	40 12 59	4085	41 23 6	4018	42 34 28	3947
	$\alpha$ Arietis E.	66 10 37	3075	64 41 57	3071	63 13 12	3068	61 44 23	3065
	Aldebaran E.	98 30 21	2931	96 58 41	2923	95 26 52	2916	93 54 54	2909
26	Antares W.	94 1 57	2932	95 33 35	2924	97 5 23	2917	98 37 20	2909
	$\alpha$ Aquilæ W.	48 47 16	3672	50 4 33	3628	51 22 37	3587	52 41 25	3550
	$\alpha$ Arietis E.	54 19 36	3057	52 50 34	3057	51 21 32	3058	49 52 31	3060
	Aldebaran E.	86 12 40	2971	84 39 44	2963	83 6 38	2955	81 33 22	2948
27	$\alpha$ Aquilæ W.	59 24 58	3393	60 47 22	3367	62 10 16	3344	63 33 37	3320
	$\alpha$ Arietis E.	42 28 24	3025	40 59 56	3096	39 31 41	3108	38 3 41	3123
	Aldebaran E.	73 44 28	2908	72 10 10	2799	70 35 41	2791	69 1 1	2782
	SATURN E.	101 19 40	2850	99 46 17	2842	98 12 44	2834	96 39 0	2825
28	$\alpha$ Aquilæ W.	70 36 44	3990	72 2 30	3902	73 28 37	3186	74 55 3	3170
	Fomalhaut W.	39 29 31	3748	40 45 27	3676	42 2 40	3610	43 21 4	3550
	Aldebaran E.	61 4 58	2741	59 29 12	2731	57 53 14	2723	56 17 5	2714
	SATURN E.	88 47 30	2782	87 12 38	2773	85 37 35	2765	84 2 21	2756
	MARS E.	100 43 17	2985	99 12 45	2976	97 42 2	2966	96 11 7	2958
29	$\alpha$ Aquilæ W.	82 11 39	3101	83 39 47	3090	85 8 9	3078	86 36 45	3068
	Fomalhaut W.	50 8 0	3313	51 31 56	3276	52 56 36	3241	54 21 57	3208
	$\alpha$ Pegasi W.	35 0 30	3479	36 21 18	3409	37 43 24	3347	39 6 41	3291
	Aldebaran E.	48 13 22	2670	46 36 2	2661	44 58 29	2652	43 20 44	2642
	SATURN E.	76 3 13	2711	74 26 48	2702	72 50 11	2693	71 13 22	2684
	MARS E.	88 33 35	2909	87 1 28	2900	85 29 9	2890	83 56 37	2880
	Pollux E.	91 54 54	2756	90 19 28	2747	88 43 50	2738	87 8 0	2729
30	Fomalhaut W.	61 37 49	3089	63 6 36	3046	64 35 52	3023	66 5 36	3002
	$\alpha$ Pegasi W.	46 17 54	3072	47 46 38	3039	49 16 3	3006	50 46 8	2977
	Aldebaran E.	35 8 46	2595	33 29 44	2585	31 50 28	2575	30 10 59	2565
	SATURN E.	63 6 9	2638	61 28 5	2628	59 49 48	2618	58 11 18	2610
	MARS E.	76 10 52	2931	74 37 5	2921	73 3 4	2911	71 28 50	2901
	Pollux E.	79 5 53	2624	77 28 52	2676	75 51 40	2667	74 14 16	2659
	SUN E.	124 9 19	2927	122 37 34	2916	121 5 35	2905	119 33 23	2894
31	Fomalhaut W.	73 40 31	2909	75 12 38	2893	76 45 6	2876	78 17 55	2861
	$\alpha$ Pegasi W.	58 25 17	2850	59 58 40	2828	61 32 31	2808	63 6 49	2788
	SATURN E.	49 55 36	2582	48 15 49	2553	46 35 49	2543	44 55 36	2535
	MARS E.	63 34 26	2750	61 58 53	2740	60 23 6	2730	58 47 6	2720
	Pollux E.	66 4 33	2619	64 26 4	2612	62 47 25	2605	61 8 37	2599
	SUN E.	111 48 53	2639	110 15 16	2626	108 41 25	2617	107 7 19	2605

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
22	$\alpha$ Arietis E.	95° 25' 16"	3166	93° 58' 26"	3161	92° 31' 30"	3157	91° 4' 29"	3156
23	Antares W.	64 2 2	3069	65 30 34	3074	66 59 15	3067	68 28 5	3060
	$\alpha$ Pegasi E.	42 14 17	3005	40 55 48	3036	39 37 53	3079	38 20 36	3719
	$\alpha$ Arietis E.	83 47 58	3128	82 20 23	3194	80 52 42	3118	79 24 54	3113
24	Antares W.	75 54 33	3092	77 24 18	3014	78 54 13	3007	80 24 17	3000
	$\alpha$ Arietis E.	72 4 31	3091	70 36 10	3087	69 7 44	3069	67 39 13	3078
	Aldebaran E.	104 35 34	2958	103 4 29	2951	101 33 15	2944	100 1 52	2938
25	Antares W.	87 56 58	2992	89 27 59	2954	90 59 9	2947	92 30 28	2939
	$\alpha$ Aquilæ W.	43 47 0	3083	45 0 37	3093	46 15 15	3709	47 30 49	3719
	$\alpha$ Arietis E.	60 15 31	3063	58 46 36	3061	57 17 38	3059	55 48 38	3057
	Aldebaran E.	92 22 46	2901	90 50 29	2894	89 18 2	2887	87 45 26	2879
26	Antares W.	100 9 27	2902	101 41 43	2895	103 14 8	2888	104 46 42	2881
	$\alpha$ Aquilæ W.	54 0 54	3515	55 21 2	3489	56 41 46	3451	58 3 5	3491
	$\alpha$ Arietis E.	48 23 33	3063	46 54 38	3066	45 25 47	3071	43 57 2	3077
	Aldebaran E.	79 59 56	2940	78 26 20	2931	76 52 33	2924	75 18 36	2915
27	$\alpha$ Aquilæ W.	64 57 25	2998	66 21 39	2976	67 46 18	2957	69 11 20	2938
	$\alpha$ Arietis E.	36 35 59	3141	35 8 39	3169	33 41 45	3188	32 15 22	3219
	Aldebaran E.	67 26 10	2774	65 51 8	2766	64 15 56	2758	62 40 33	2749
	SATURN E.	95 5 4	2816	93 30 57	2808	91 56 39	2799	90 22 10	2791
28	$\alpha$ Aquilæ W.	76 21 48	3155	77 48 51	3141	79 16 11	3128	80 43 47	3114
	Fomalhaut W.	44 40 33	2495	46 1 3	2444	47 22 30	2397	48 44 50	2353
	Aldebaran E.	54 40 44	2705	53 4 11	2696	51 27 26	2688	49 50 30	2679
	SATURN E.	82 26 55	2747	80 51 17	2738	79 15 27	2729	77 39 26	2720
	MARS E.	94 40 1	2948	93 8 43	2939	91 37 13	2929	90 5 30	2919
29	$\alpha$ Aquilæ W.	88 5 34	3057	89 34 36	3047	91 3 50	3039	92 33 15	3030
	Fomalhaut W.	55 47 57	3177	57 14 34	3148	58 41 46	3119	60 9 32	3094
	$\alpha$ Pegasi W.	40 31 3	2929	41 56 26	3192	43 22 45	3149	44 49 55	3109
	Aldebaran E.	41 42 46	2639	40 4 35	2623	38 26 11	2614	36 47 35	2604
	SATURN E.	69 36 20	2675	67 59 6	2666	66 21 40	2656	64 44 1	2646
	MARS E.	82 23 53	2871	80 50 57	2861	79 17 48	2851	77 44 26	2843
	Pollux E.	85 31 50	2690	83 55 46	2711	82 19 21	2701	80 42 43	2692
30	Fomalhaut W.	67 35 46	2981	69 6 22	2969	70 37 22	2944	72 8 45	2926
	$\alpha$ Pegasi W.	52 16 50	2948	53 48 8	2921	55 20 0	2897	56 52 23	2873
	Aldebaran E.	28 31 16	2555	26 51 19	2545	25 11 9	2535	23 30 45	2525
	SATURN E.	56 32 36	2600	54 53 41	2590	53 14 32	2580	51 35 10	2573
	MARS E.	69 54 24	2799	68 19 45	2781	66 44 52	2771	65 9 46	2760
	Pollux E.	72 36 41	2651	70 58 55	2643	69 20 58	2635	67 42 51	2627
	SUN E.	118 0 57	2983	116 28 17	2973	114 55 23	2962	113 22 15	2951
31	Fomalhaut W.	79 51 4	2947	81 24 31	2933	82 58 16	2919	84 32 19	2907
	$\alpha$ Pegasi W.	64 41 32	2769	66 16 40	2751	67 52 12	2733	69 28 8	2716
	SATURN E.	43 15 11	2595	41 34 33	2516	39 53 42	2508	38 12 40	2499
	MARS E.	57 10 53	2710	55 34 27	2700	53 57 47	2690	52 20 54	2680
	Pollux E.	59 29 40	2599	57 50 34	2585	56 11 19	2580	54 31 57	2575
	SUN E.	105 32 58	2795	103 58 23	2789	102 23 32	2771	100 48 26	2760

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	N. <sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Tues.	1	10 43 0.85	9.067	N. 8 8 16.2	-54.59	15 53.81	64.40	0 14.15	0.788
Wed.	2	10 46 38.33	9.056	7 46 22.2	54.92	15 54.03	64.36	0 33.19	0.799
Thur.	3	10 50 15.55	9.046	7 24 20.6	55.23	15 54.26	64.32	0 52.47	0.809
Frid.	4	10 53 52.53	9.036	7 2 11.6	-55.53	15 54.49	64.28	1 11.98	0.819
Sat.	5	10 57 29.28	9.027	6 39 55.6	55.81	15 54.73	64.24	1 31.72	0.828
SUN.	6	11 1 5.83	9.019	6 17 32.9	56.08	15 54.97	64.21	1 51.67	0.836
Mon.	7	11 4 42.19	9.011	5 55 4.0	-56.33	15 55.22	64.18	2 11.81	0.844
Tues.	8	11 8 18.38	9.004	5 32 29.3	56.57	15 55.46	64.15	2 32.12	0.851
Wed.	9	11 11 54.40	8.998	5 9 49.0	56.80	15 55.71	64.13	2 52.59	0.857
Thur.	10	11 15 30.28	8.992	4 47 3.4	-57.01	15 55.96	64.11	3 13.21	0.863
Frid.	11	11 19 6.03	8.987	4 24 12.8	57.20	15 56.21	64.09	3 33.95	0.868
Sat.	12	11 22 41.67	8.983	4 1 17.7	57.38	15 56.47	64.08	3 54.81	0.872
SUN.	13	11 26 17.20	8.979	3 38 18.3	-57.55	15 56.73	64.07	4 15.77	0.876
Mon.	14	11 29 52.66	8.976	3 15 15.0	57.71	15 56.99	64.06	4 36.81	0.879
Tues.	15	11 33 28.05	8.974	2 52 8.1	57.85	15 57.26	64.06	4 57.92	0.881
Wed.	16	11 37 3.38	8.973	2 28 58.1	-57.98	15 57.53	64.06	5 19.06	0.882
Thur.	17	11 40 38.70	8.972	2 5 45.2	58.09	15 57.80	64.06	5 40.25	0.883
Frid.	18	11 44 14.01	8.972	1 42 29.7	58.10	15 58.07	64.06	6 1.44	0.883
Sat.	19	11 47 49.34	8.973	1 19 12.0	-58.27	15 58.34	64.07	6 22.60	0.882
SUN.	20	11 51 24.71	8.975	0 55 52.6	58.34	15 58.61	64.08	6 43.73	0.880
Mon.	21	11 55 0.12	8.978	0 32 31.5	58.40	15 58.89	64.09	7 4.80	0.877
Tues.	22	11 58 35.63	8.982	N. 0 9 9.2	-58.45	15 59.16	64.10	7 25.80	0.873
Wed.	23	12 2 11.24	8.987	S. 0 14 13.9	58.48	15 59.43	64.12	7 46.68	0.868
Thur.	24	12 5 46.98	8.993	0 37 37.7	58.50	15 59.70	64.14	8 7.43	0.862
Frid.	25	12 9 22.88	9.000	1 1 1.7	-58.50	15 59.98	64.17	8 28.02	0.855
Sat.	26	12 12 58.97	9.008	1 24 25.6	58.49	16 0.25	64.20	8 48.43	0.847
SUN.	27	12 16 35.27	9.017	1 47 49.2	58.46	16 0.52	64.23	9 8.63	0.838
Mon.	28	12 20 11.79	9.027	2 11 11.9	-58.42	16 0.79	64.26	9 28.61	0.828
Tues.	29	12 23 48.55	9.038	2 34 33.5	58.37	16 1.06	64.30	9 48.34	0.817
Wed.	30	12 27 25.59	9.050	2 57 53.8	58.30	16 1.33	64.34	10 7.80	0.805
Thur.	31	12 31 2.93	9.063	S. 3 21 12.3	-58.23	16 1.60	64.38	10 26.96	0.792

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.  
 The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing;  
 south declinations, increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Tues.	1	10 <sup>h</sup> 43 <sup>m</sup> 0.89	9.069	N. 8° 8' 16.0"	-54.60	0 <sup>m</sup> 14.15	0.798	10 <sup>h</sup> 43 <sup>m</sup> 15.04
Wed.	2	10 46 38.41	9.058	7 46 21.7	54.93	0 33.19	0.799	10 47 11.60
Thur.	3	10 50 15.68	9.048	7 24 19.8	55.24	0 52.47	0.809	10 51 8.15
Frid.	4	10 53 52.71	9.038	7 2 10.5	-55.54	1 11.99	0.819	10 55 4.70
Sat.	5	10 57 29.51	9.029	6 39 54.2	55.82	1 31.74	0.828	10 59 1.25
SUN.	6	11 1 6.11	9.021	6 17 31.3	56.09	1 51.70	0.836	11 2 57.81
Mon.	7	11 4 42.52	9.013	5 55 2.1	-56.34	2 11.84	0.844	11 6 54.36
Tues.	8	11 8 18.76	9.006	5 32 27.0	56.58	2 32.15	0.851	11 10 50.91
Wed.	9	11 11 54.83	9.000	5 9 46.3	56.81	2 52.63	0.857	11 14 47.46
Thur.	10	11 15 30.76	8.994	4 47 0.3	-57.02	3 13.25	0.863	11 18 44.01
Frid.	11	11 19 6.56	8.989	4 24 9.4	57.22	3 34.00	0.868	11 22 40.56
Sat.	12	11 22 42.25	8.985	4 1 13.9	57.40	3 54.86	0.872	11 26 37.11
SUN.	13	11 26 17.84	8.981	3 38 14.2	-57.57	4 15.82	0.876	11 30 33.66
Mon.	14	11 29 53.35	8.978	3 15 10.5	57.73	4 36.87	0.879	11 34 30.22
Tues.	15	11 33 28.79	8.976	2 52 3.3	57.87	4 57.99	0.881	11 38 26.78
Wed.	16	11 37 4.18	8.975	2 28 52.9	-58.00	5 19.15	0.882	11 42 23.33
Thur.	17	11 40 39.55	8.974	2 5 39.7	58.11	5 40.33	0.883	11 46 19.88
Frid.	18	11 44 14.91	8.974	1 42 23.9	58.21	6 1.52	0.883	11 50 16.43
Sat.	19	11 47 50.29	8.975	1 19 5.8	-58.29	6 22.69	0.883	11 54 12.98
SUN.	20	11 51 25.71	8.977	0 55 46.0	58.36	6 43.82	0.880	11 58 9.53
Mon.	21	11 55 1.18	8.980	0 32 24.6	58.42	7 4.90	0.877	12 2 6.08
Tues.	22	11 58 36.74	8.984	N. 0 9 1.9	-58.47	7 25.90	0.873	12 6 2.64
Wed.	23	12 2 12.40	8.989	S. 0 14 21.7	58.50	7 46.79	0.868	12 9 59.19
Thur.	24	12 5 48.20	8.905	0 37 45.7	58.52	8 7.54	0.862	12 13 55.74
Frid.	25	12 9 24.15	9.002	1 1 10.0	-58.52	8 28.14	0.855	12 17 52.29
Sat.	26	12 13 0.29	9.010	1 24 34.2	58.51	8 48.55	0.847	12 21 48.84
SUN.	27	12 16 36.64	9.019	1 47 58.1	58.48	9 8.75	0.838	12 25 45.39
Mon.	28	12 20 13.21	9.029	2 11 21.1	-58.44	9 28.73	0.828	12 29 41.94
Tues.	29	12 23 50.03	9.040	2 34 43.0	58.39	9 48.47	0.817	12 33 38.50
Wed.	30	12 27 27.12	9.052	2 58 3.6	58.32	10 7.93	0.805	12 37 35.05
Thur.	31	12 31 4.52	9.065	S. 3 21 22.4	-58.24	10 27.08	0.792	12 41 31.60

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.

Diff. for 1 Hour,  
+ 9.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	244	159° 10' 11.5	9' 38.2	145.31	— 0.37	0.0037141	— 42.8	<sup>h</sup> 13 <sup>m</sup> 14.34 <sup>s</sup> 43
2	245	160 8 19.9	7 46.5	145.39	0.41	0.0036108	43.3	13 10 38.52
3	246	161 6 30.3	5 56.8	145.48	0.42	0.0035063	43.8	13 6 42.61
4	247	162 4 42.8	4 9.2	145.56	— 0.39	0.0034006	— 44.3	13 2 46.71
5	248	163 2 57.3	2 23.6	145.65	0.35	0.0032935	44.9	12 58 50.80
6	249	164 1 13.7	0 39.9	145.73	0.27	0.0031850	45.5	12 54 54.89
7	250	164 59 32.0	58 58.2	145.81	— 0.17	0.0030749	— 46.2	12 50 58.99
8	251	165 57 52.3	57 18.4	145.88	— 0.05	0.0029634	46.8	12 47 3.09
9	252	166 56 14.5	55 40.5	145.96	+ 0.08	0.0028504	47.4	12 43 7.18
10	253	167 54 38.5	54 4.4	146.03	+ 0.21	0.0027359	— 48.0	12 39 11.27
11	254	168 53 4.3	52 30.1	146.11	0.34	0.0026199	48.6	12 35 15.37
12	255	169 51 31.8	50 57.6	146.18	0.45	0.0025026	49.1*	12 31 19.47
13	256	170 50 1.0	49 26.7	146.25	+ 0.54	0.0023841	— 49.6	12 27 23.56
14	257	171 48 31.9	47 57.5	146.32	0.62	0.0022644	50.1	12 23 27.65
15	258	172 47 4.4	46 29.9	146.39	0.67	0.0021438	50.5	12 19 31.74
16	259	173 45 38.6	45 4.1	146.46	+ 0.68	0.0020222	— 50.8	12 15 35.84
17	260	174 44 14.5	43 39.9	146.53	0.67	0.0018999	51.0	12 11 39.93
18	261	175 42 52.0	42 17.3	146.60	0.63	0.0017772	51.2	12 7 44.02
19	262	176 41 31.1	40 56.3	146.67	+ 0.55	0.0016541	— 51.3	12 3 48.12
20	263	177 40 11.9	39 37.0	146.74	0.45	0.0015308	51.4	11 59 52.22
21	264	178 38 54.5	38 19.5	146.81	0.33	0.0014074	51.4	11 55 56.31
22	265	179 37 39.0	37 3.9	146.89	+ 0.20	0.0012840	— 51.4	11 52 0.40
23	266	180 36 25.3	35 50.2	146.97	+ 0.06	0.0011608	51.3	11 48 4.49
24	267	181 35 13.6	34 38.4	147.05	— 0.08	0.0010379	51.2	11 44 8.59
25	268	182 34 3.9	33 28.6	147.14	— 0.21	0.0009151	— 51.1	11 40 12.68
26	269	183 32 56.3	32 20.9	147.23	0.32	0.0007926	51.0	11 36 16.77
27	270	184 31 50.9	31 15.5	147.32	0.42	0.0006703	50.9	11 32 20.86
28	271	185 30 47.7	30 12.2	147.41	— 0.49	0.0005482	— 50.9	11 28 24.96
29	272	186 29 46.7	29 11.1	147.50	0.54	0.0004261	50.9	11 24 29.06
30	273	187 28 48.0	28 12.3	147.59	0.55	0.0003041	50.9	11 20 33.15
31	274	188 27 51.6	27 15.9	147.69	— 0.52	0.0001822	— 50.8	11 16 37.25
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> .0.								
								Diff. for 1 Hour, — 9 <sup>m</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>
1	15 55.0	15 59.8	58 18.1	+ 1.47	58 35.7	+ 1.46	17 51.3	2.33	22.0
2	16 4.5	16 9.1	58 53.1	1.43	59 9.9	1.36	18 48.2	2.42	23.0
3	16 13.4	16 17.4	59 25.7	1.27	59 40.3	1.15	19 46.8	2.46	24.0
4	16 20.9	16 23.8	59 53.2	+ 0.99	60 4.1	+ 0.80	20 46.0	2.46	25.0
5	16 26.1	16 27.6	60 12.4	0.57	60 17.8	+ 0.32	21 44.4	2.41	26.0
6	16 28.2	16 27.9	60 20.1	+ 0.05	60 19.0	- 0.24	22 41.4	2.33	27.0
7	16 26.6	16 24.4	60 14.3	- 0.53	60 6.1	- 0.83	23 36.5	2.25	28.0
8	16 21.2	16 17.1	59 54.3	1.12	59 39.3	1.37	0		29.0
9	16 12.2	16 6.6	59 21.3	1.60	59 0.8	1.79	0 29.5	2.18	0.6
10	16 0.5	15 54.0	58 38.3	- 1.93	58 14.3	- 2.03	1 21.0	2.12	1.6
11	15 47.2	15 40.3	57 49.4	2.10	57 24.0	2.11	2 11.3	2.07	2.6
12	15 33.4	15 26.7	56 58.8	2.07	56 34.3	2.00	3 0.7	2.05	3.6
13	15 20.3	15 14.3	56 10.8	- 1.90	55 48.8	- 1.77	3 49.7	2.03	4.6
14	15 8.8	15 3.9	55 28.5	1.61	55 10.3	1.42	4 38.3	2.02	5.6
15	14 59.5	14 55.8	54 54.3	1.23	54 40.8	1.02	5 26.6	2.01	6.6
16	14 52.8	14 50.5	54 29.7	- 0.82	54 21.2	- 0.60	6 14.6	1.99	7.6
17	14 48.9	14 48.0	54 15.3	- 0.39	54 11.9	- 0.18	7 2.1	1.97	8.6
18	14 47.7	14 48.1	54 11.0	+ 0.02	54 12.5	+ 0.22	7 49.0	1.94	9.6
19	14 49.2	14 50.8	54 16.3	+ 0.40	54 22.2	+ 0.57	8 35.2	1.92	10.6
20	14 52.9	14 55.6	54 30.1	0.73	54 39.8	0.87	9 20.8	1.89	11.6
21	14 58.6	15 2.0	54 51.0	0.98	55 3.5	1.08	10 6.3	1.89	12.6
22	15 5.7	15 9.7	55 17.1	+ 1.17	55 31.6	+ 1.23	10 51.7	1.89	13.6
23	15 13.8	15 18.0	55 46.7	1.27	56 2.2	1.30	11 37.3	1.92	14.6
24	15 22.3	15 26.6	56 17.9	1.31	56 33.7	1.30	12 23.9	1.96	15.6
25	15 30.8	15 34.9	56 49.2	+ 1.28	57 4.4	+ 1.25	13 11.7	2.03	16.6
26	15 39.0	15 42.8	57 19.2	1.21	57 33.4	1.17	14 1.4	2.11	17.6
27	15 46.5	15 50.1	57 47.0	1.11	58 0.0	1.05	14 53.3	2.21	18.6
28	15 53.4	15 56.6	58 12.4	+ 1.00	58 24.0	+ 0.94	15 47.3	2.30	19.6
29	15 59.6	16 2.3	58 34.9	0.88	58 45.1	0.82	16 43.3	2.37	20.6
30	16 4.9	16 7.2	58 54.5	0.75	59 3.0	0.67	17 40.5	2.40	21.6
31	16 9.3	16 11.1	59 10.6	+ 0.59	59 17.2	+ 0.50	18 38.1	2.39	22.6

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 1.					THURSDAY 3.				
0	<sup>h</sup> 3 <sup>m</sup> 55 <sup>s</sup> 5.62	2.3358	N.15° 29' 49.7"	5.750	0	<sup>h</sup> 5 <sup>m</sup> 51 <sup>s</sup> 27.64	2.4076	N.18° 10' 14.2"	0.664
1	3 57 25.89	2.3399	15 35 32.1	5.692	1	5 53 57.56	2.4098	18 10 50.4	0.543
2	3 59 46.41	2.3440	15 41 9.2	5.573	2	5 56 27.61	2.5019	18 11 19.3	0.422
3	4 2 7.17	2.3480	15 46 40.9	5.483	3	5 58 57.79	2.5040	18 11 41.0	0.301
4	4 4 28.17	2.3520	15 52 7.2	5.393	4	6 1 28.09	2.5050	18 11 55.4	0.179
5	4 6 49.41	2.3561	15 57 28.1	5.302	5	6 3 58.50	2.5078	18 12 2.5	+ 0.056
6	4 9 10.00	2.3601	16 2 43.5	5.210	6	6 6 29.03	2.5097	18 12 2.3	- 0.064
7	4 11 32.63	2.3641	16 7 53.3	5.117	7	6 8 59.66	2.5114	18 11 54.8	0.187
8	4 13 54.59	2.3680	16 12 57.5	5.023	8	6 11 30.40	2.5132	18 11 39.9	0.310
9	4 16 16.79	2.3720	16 17 56.1	4.929	9	6 14 1.24	2.5148	18 11 17.6	0.433
10	4 18 39.23	2.3759	16 22 49.0	4.833	10	6 16 32.17	2.5163	18 10 47.9	0.556
11	4 21 1.90	2.3798	16 27 36.1	4.737	11	6 19 3.19	2.5178	18 10 10.8	0.679
12	4 23 24.81	2.3837	16 32 17.4	4.641	12	6 21 34.30	2.5192	18 9 26.4	0.803
13	4 25 47.95	2.3876	16 36 52.8	4.542	13	6 24 5.49	2.5205	18 8 34.5	0.927
14	4 28 11.32	2.3914	16 41 22.4	4.443	14	6 26 36.76	2.5217	18 7 35.2	1.050
15	4 30 34.92	2.3953	16 45 46.0	4.343	15	6 29 8.10	2.5229	18 6 28.5	1.173
16	4 32 58.75	2.3991	16 50 3.6	4.242	16	6 31 39.51	2.5240	18 5 14.4	1.297
17	4 35 22.81	2.4028	16 54 15.1	4.141	17	6 34 10.98	2.5251	18 3 52.8	1.422
18	4 37 47.09	2.4066	16 58 20.5	4.039	18	6 36 42.52	2.5261	18 2 23.8	1.546
19	4 40 11.60	2.4103	17 2 19.8	3.936	19	6 39 14.11	2.5269	18 0 47.4	1.669
20	4 42 36.32	2.4139	17 6 12.8	3.832	20	6 41 45.75	2.5277	17 59 3.5	1.793
21	4 45 1.26	2.4175	17 9 59.6	3.728	21	6 44 17.44	2.5285	17 57 12.2	1.917
22	4 47 26.42	2.4211	17 13 40.1	3.623	22	6 46 49.17	2.5291	17 55 13.5	2.041
23	4 49 51.79	2.4246	N.17 17 14.3	3.518	23	6 49 20.93	2.5297	N.17 53 7.3	2.165
WEDNESDAY 2.					FRIDAY 4.				
0	4 52 17.37	2.4281	N.17 20 42.2	3.411	0	6 51 52.73	2.5309	N.17 50 53.7	2.288
1	4 54 43.16	2.4316	17 24 3.7	3.303	1	6 54 24.56	2.5307	17 48 32.7	2.412
2	4 57 9.16	2.4351	17 27 18.6	3.194	2	6 56 56.41	2.5310	17 46 4.3	2.535
3	4 59 35.37	2.4385	17 30 27.0	3.086	3	6 59 28.28	2.5313	17 43 28.5	2.658
4	5 2 1.78	2.4418	17 33 28.9	2.977	4	7 2 0.17	2.5316	17 40 45.3	2.782
5	5 4 28.38	2.4450	17 36 24.2	2.868	5	7 4 32.07	2.5317	17 37 54.7	2.905
6	5 6 55.18	2.4483	17 39 12.8	2.755	6	7 7 3.97	2.5317	17 34 56.7	3.027
7	5 9 22.18	2.4515	17 41 54.8	2.644	7	7 9 35.87	2.5317	17 31 51.4	3.149
8	5 11 49.36	2.4546	17 44 30.1	2.532	8	7 12 7.77	2.5317	17 28 38.8	3.271
9	5 14 16.73	2.4577	17 46 58.6	2.418	9	7 14 39.67	2.5316	17 25 18.8	3.393
10	5 16 44.29	2.4608	17 49 20.3	2.305	10	7 17 11.56	2.5313	17 21 51.6	3.514
11	5 19 12.03	2.4638	17 51 35.2	2.192	11	7 19 43.43	2.5309	17 18 17.1	3.636
12	5 21 39.94	2.4667	17 53 43.3	2.078	12	7 22 15.27	2.5305	17 14 35.3	3.757
13	5 24 8.03	2.4696	17 55 44.5	1.963	13	7 24 47.09	2.5301	17 10 46.3	3.877
14	5 26 36.29	2.4725	17 57 38.8	1.847	14	7 27 18.88	2.5296	17 6 50.1	3.997
15	5 29 4.73	2.4753	17 59 26.1	1.730	15	7 29 50.64	2.5291	17 2 46.7	4.116
16	5 31 33.33	2.4780	18 1 6.4	1.613	16	7 32 22.37	2.5284	16 58 36.2	4.235
17	5 34 2.09	2.4807	18 2 39.7	1.497	17	7 34 54.05	2.5276	16 54 12.5	4.354
18	5 36 31.01	2.4833	18 4 6.0	1.379	18	7 37 25.68	2.5267	16 49 53.7	4.473
19	5 39 0.08	2.4858	18 5 25.2	1.261	19	7 39 57.26	2.5259	16 45 21.9	4.589
20	5 41 29.30	2.4883	18 6 37.3	1.142	20	7 42 28.79	2.5250	16 40 43.0	4.706
21	5 43 58.68	2.4908	18 7 42.3	1.023	21	7 45 0.26	2.5240	16 35 57.1	4.822
22	5 46 28.20	2.4931	18 8 40.1	0.903	22	7 47 31.67	2.5229	16 31 4.3	4.938
23	5 48 57.85	2.4954	18 9 30.7	0.784	23	7 50 3.01	2.5218	16 26 4.5	5.054
24	5 51 27.64	2.4976	N.18 10 14.2	0.664	24	7 52 34.28	2.5206	N.16 20 57.8	5.168



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 5.					MONDAY 7.				
0	h m s.	s	N. 16° 20' 57.8"	5.168	0	h m s.	s	N. 10° 17' 15.8"	9.579
1	7 52 34.28	2.5906	16 15 44.3	5.382	1	9 51 11.13	2.4070	10 7 39.1	9.642
2	7 55 5.48	2.5193	16 10 24.0	5.396	2	9 53 35.46	2.4040	9 57 58.7	9.704
3	7 57 36.60	2.5180	16 4 56.8	5.509	3	9 55 59.61	2.4009	9 48 14.6	9.765
4	8 0 7.64	2.5166	15 59 22.9	5.690	4	9 58 23.57	2.3978	9 38 26.9	9.825
5	8 2 38.59	2.5151	15 53 42.4	5.731	5	10 0 47.35	2.3948	9 28 35.6	9.883
6	8 5 9.45	2.5136	15 47 55.2	5.849	6	10 3 10.95	2.3917	9 18 40.9	9.939
7	8 7 40.22	2.5120	15 42 1.4	5.951	7	10 5 34.36	2.3886	9 8 42.9	9.995
8	8 10 10.89	2.5103	15 36 1.1	6.060	8	10 7 57.58	2.3855	8 58 41.5	10.050
9	8 12 41.46	2.5087	15 29 54.2	6.168	9	10 10 20.62	2.3824	8 48 36.9	10.103
10	8 15 11.93	2.5070	15 23 40.9	6.275	10	10 12 43.47	2.3793	8 38 29.2	10.154
11	8 17 42.30	2.5059	15 17 21.2	6.380	11	10 15 6.14	2.3762	8 28 18.4	10.204
12	8 20 12.56	2.5034	15 10 55.1	6.487	12	10 17 28.62	2.3731	8 18 4.7	10.252
13	8 22 42.71	2.5015	15 4 22.7	6.592	13	10 19 50.91	2.3700	8 7 48.1	10.300
14	8 25 12.74	2.4995	14 57 44.1	6.695	14	10 22 13.02	2.3669	7 57 28.7	10.346
15	8 27 42.65	2.4975	14 50 59.3	6.798	15	10 24 34.94	2.3638	7 47 6.6	10.390
16	8 30 12.44	2.4954	14 44 8.3	6.901	16	10 26 56.68	2.3607	7 36 41.9	10.433
17	8 32 42.10	2.4933	14 37 11.2	7.002	17	10 29 18.23	2.3577	7 25 14.6	10.475
18	8 35 11.63	2.4911	14 30 8.1	7.102	18	10 31 39.60	2.3547	7 15 44.9	10.515
19	8 37 41.03	2.4889	14 22 59.0	7.201	19	10 34 0.79	2.3516	7 5 12.8	10.554
20	8 40 10.30	2.4867	14 15 44.0	7.300	20	10 36 21.79	2.3485	6 54 38.4	10.592
21	8 42 39.43	2.4844	14 8 23.2	7.398	21	10 38 42.61	2.3454	6 44 1.7	10.629
22	8 45 8.43	2.4821	14 0 56.6	7.491	22	10 41 3.24	2.3424	6 33 22.9	10.664
23	8 47 37.28	2.4797	N. 13° 53' 24.3"	7.585	23	10 43 23.70	2.3394	N. 6° 22' 42.0"	10.697
24	8 50 5.99	2.4773				10 45 43.97	2.3363		
SUNDAY 6.					TUESDAY 8.				
0	h m s.	s	N. 13° 45' 46.4"	7.679	0	h m s.	s	N. 6° 11' 59.2"	10.729
1	8 52 34.55	2.4747	13 38 2.9	7.772	1	10 48 4.06	2.3333	6 1 14.5	10.761
2	8 55 2.96	2.4722	13 30 13.8	7.864	2	10 50 23.97	2.3303	5 50 27.9	10.791
3	8 57 31.22	2.4697	13 22 19.2	7.954	3	10 52 43.70	2.3273	5 39 39.6	10.818
4	8 59 59.33	2.4673	13 14 19.3	8.043	4	10 55 3.25	2.3243	5 28 49.7	10.845
5	9 2 27.28	2.4646	13 6 14.0	8.132	5	10 57 22.62	2.3214	5 17 58.2	10.871
6	9 4 55.08	2.4620	12 58 3.4	8.220	6	10 59 41.82	2.3185	5 7 5.2	10.895
7	9 7 22.72	2.4593	12 49 47.6	8.305	7	11 2 0.84	2.3155	4 56 10.8	10.918
8	9 9 50.20	2.4566	12 41 26.8	8.389	8	11 4 19.68	2.3126	4 45 15.0	10.940
9	9 12 17.51	2.4538	12 33 0.9	8.473	9	11 6 38.35	2.3097	4 34 18.0	10.959
10	9 14 44.66	2.4511	12 24 30.0	8.556	10	11 8 56.85	2.3069	4 23 19.9	10.978
11	9 17 11.64	2.4483	12 15 54.2	8.637	11	11 11 15.18	2.3040	4 12 20.6	10.997
12	9 19 38.45	2.4455	12 7 13.5	8.717	12	11 13 33.33	2.3011	4 1 20.3	11.013
13	9 22 5.10	2.4427	11 58 28.1	8.796	13	11 15 51.31	2.2983	3 50 19.1	11.028
14	9 24 31.58	2.4398	11 49 38.0	8.873	14	11 18 9.12	2.2955	3 39 17.0	11.041
15	9 26 57.88	2.4368	11 40 43.3	8.949	15	11 20 26.77	2.2927	3 28 14.2	11.053
16	9 29 24.00	2.4339	11 31 44.1	9.024	16	11 22 44.25	2.2899	3 17 10.7	11.064
17	9 31 49.95	2.4310	11 22 40.4	9.098	17	11 25 1.56	2.2872	3 6 6.5	11.075
18	9 34 15.72	2.4281	11 13 32.3	9.171	18	11 27 18.71	2.2845	2 55 1.7	11.083
19	9 36 41.32	2.4253	11 4 19.9	9.242	19	11 29 35.70	2.2818	2 43 56.5	11.090
20	9 39 6.74	2.4225	10 55 3.2	9.312	20	11 31 52.53	2.2791	2 32 50.9	11.096
21	9 41 31.98	2.4198	10 45 42.4	9.381	21	11 34 9.20	2.2764	2 21 45.0	11.100
22	9 43 57.04	2.4169	10 36 17.5	9.448	22	11 36 25.70	2.2738	2 10 38.9	11.103
23	9 46 21.92	2.4139	10 26 48.6	9.514	23	11 38 42.05	2.2712	1 59 32.6	11.106
24	9 48 46.62	2.4101	N. 10° 17' 15.8"	9.579	24	11 40 58.24	2.2686	N. 1° 48' 26.2"	11.107
	9 51 11.13	2.4070				11 43 14.28	2.2661		

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 9.					FRIDAY 11.				
0	11 <sup>h</sup> 43 <sup>m</sup> 14.28 <sup>s</sup>	2.9861	N. 1° 48' 26.2"	11.107	0	13 <sup>h</sup> 29 <sup>m</sup> 32.30 <sup>s</sup>	2.1738	S. 6° 44' 5.7"	9.856
1	11 45 30.17	2.9835	1 37 19.8	11.107	1	13 31 42.65	2.1719	6 53 55.6	9.807
2	11 47 45.90	2.9809	1 26 13.4	11.105	2	13 33 52.93	2.1707	7 3 42.5	9.757
3	11 50 1.48	2.9583	1 15 7.2	11.102	3	13 36 3.13	2.1694	7 13 26.5	9.707
4	11 52 16.91	2.9559	1 4 1.2	11.098	4	13 38 13.26	2.1688	7 23 7.4	9.655
5	11 54 32.19	2.9535	0 52 55.5	11.093	5	13 40 23.31	2.1680	7 32 45.1	9.602
6	11 56 47.33	2.9519	0 41 50.1	11.087	6	13 42 33.29	2.1657	7 42 19.7	9.550
7	11 59 2.33	2.9488	0 30 45.1	11.079	7	13 44 43.20	2.1646	7 51 51.1	9.497
8	12 1 17.18	2.9464	0 19 40.6	11.070	8	13 46 53.04	2.1634	8 1 19.3	9.442
9	12 3 31.89	2.9440	N. 0 8 36.7	11.060	9	13 49 2.81	2.1623	8 10 44.2	9.387
10	12 5 46.46	2.9417	S. 0 2 26.6	11.049	10	13 51 12.52	2.1612	8 20 5.8	9.333
11	12 8 0.89	2.9394	0 13 29.2	11.037	11	13 53 22.16	2.1602	8 29 24.0	9.275
12	12 10 15.19	2.9373	0 24 31.0	11.023	12	13 55 31.74	2.1592	8 38 38.8	9.218
13	12 12 29.36	2.9349	0 35 31.9	11.008	13	13 57 41.26	2.1581	8 47 50.2	9.161
14	12 14 43.39	2.9327	0 46 32.0	10.992	14	13 59 50.71	2.1570	8 56 58.1	9.102
15	12 16 57.28	2.9304	0 57 31.1	10.976	15	14 2 0.10	2.1560	9 6 2.4	9.042
16	12 19 11.04	2.9283	1 8 29.1	10.958	16	14 4 9.43	2.1550	9 15 3.2	8.983
17	12 21 24.68	2.9262	1 19 26.0	10.939	17	14 6 18.70	2.1540	9 24 -0.4	8.923
18	12 23 38.19	2.9241	1 30 21.8	10.919	18	14 8 27.91	2.1530	9 32 54.0	8.862
19	12 25 51.57	2.9220	1 41 16.3	10.898	19	14 10 37.06	2.1521	9 41 43.9	8.801
20	12 28 4.83	2.9200	1 52 9.5	10.876	20	14 12 46.16	2.1512	9 50 30.1	8.739
21	12 30 17.97	2.9180	2 3 1.4	10.853	21	14 14 55.21	2.1504	9 59 12.5	8.676
22	12 32 30.99	2.9160	2 13 51.9	10.828	22	14 17 4.21	2.1485	10 7 51.2	8.612
23	12 34 43.89	2.9140	S. 2 24 40.8	10.803	23	14 19 13.15	2.1486	S. 10 16 26.0	8.548
THURSDAY 10.					SATURDAY 12.				
0	12 36 56.67	2.9120	S. 2 35 28.1	10.775	0	14 21 22.04	2.1477	S. 10 24 57.0	8.484
1	12 39 9.33	2.9101	2 46 13.8	10.748	1	14 23 30.88	2.1469	10 33 24.1	8.419
2	12 41 21.88	2.9082	2 56 57.9	10.720	2	14 25 39.67	2.1462	10 41 47.3	8.353
3	12 43 34.32	2.9064	3 7 40.2	10.690	3	14 27 48.42	2.1454	10 50 6.5	8.288
4	12 45 46.65	2.9046	3 18 20.7	10.660	4	14 29 57.12	2.1446	10 58 21.8	8.222
5	12 47 58.87	2.9027	3 28 59.4	10.628	5	14 32 5.77	2.1438	11 6 33.1	8.154
6	12 50 10.98	2.9009	3 39 36.1	10.595	6	14 34 14.37	2.1430	11 14 40.3	8.086
7	12 52 22.98	2.1992	3 50 10.8	10.562	7	14 36 22.93	2.1422	11 22 43.5	8.018
8	12 54 34.88	2.1975	4 0 43.5	10.528	8	14 38 31.45	2.1416	11 30 42.5	7.949
9	12 56 46.68	2.1958	4 11 14.2	10.493	9	14 40 39.93	2.1409	11 38 37.4	7.880
10	12 58 58.37	2.1941	4 21 42.7	10.457	10	14 42 48.36	2.1402	11 46 28.1	7.811
11	13 1 9.97	2.1925	4 32 9.0	10.419	11	14 44 56.75	2.1395	11 54 14.7	7.742
12	13 3 21.47	2.1908	4 42 33.0	10.381	12	14 47 5.10	2.1388	12 1 57.1	7.671
13	13 5 32.57	2.1892	4 52 54.7	10.342	13	14 49 13.41	2.1382	12 9 35.2	7.599
14	13 7 44.18	2.1877	5 3 14.1	10.303	14	14 51 21.68	2.1376	12 17 9.0	7.527
15	13 9 55.39	2.1861	5 13 31.0	10.261	15	14 53 29.92	2.1370	12 24 38.5	7.456
16	13 12 6.51	2.1846	5 23 45.4	10.219	16	14 55 38.12	2.1363	12 32 3.7	7.384
17	13 14 17.54	2.1830	5 33 57.3	10.177	17	14 57 46.28	2.1357	12 39 24.6	7.312
18	13 16 28.47	2.1815	5 44 6.6	10.133	18	14 59 54.40	2.1351	12 46 41.1	7.239
19	13 18 39.32	2.1801	5 54 13.3	10.089	19	15 2 2.49	2.1345	12 53 53.2	7.165
20	13 20 50.06	2.1787	6 4 17.3	10.044	20	15 4 10.54	2.1339	13 1 0.9	7.091
21	13 23 0.76	2.1773	6 14 18.6	9.999	21	15 6 18.56	2.1333	13 8 4.1	7.016
22	13 25 11.36	2.1759	6 24 17.2	9.952	22	15 8 26.54	2.1327	13 15 2.8	6.941
23	13 27 21.87	2.1745	6 34 12.9	9.904	23	15 10 34.49	2.1322	13 21 57.0	6.867
24	13 29 32.30	2.1732	S. 6 44 5.7	9.856	24	15 12 42.41	2.1317	S. 13 28 46.8	6.792

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 13.					TUESDAY 15.				
0	<sup>h</sup> 15 <sup>m</sup> 12 <sup>s</sup> 42.41	2.1317	S. 13° 28' 46.8"	6.793	0	<sup>h</sup> 16 <sup>m</sup> 54 <sup>s</sup> 28.53	2.1067	S. 17° 22' 36.8"	2.875
1	15 14 50.30	2.1312	13 35 32.0	6.715	1	16 56 35.04	2.1062	17 25 26.7	2.790
2	15 16 58.15	2.1306	13 42 12.6	6.630	2	16 58 41.52	2.1077	17 28 11.6	2.706
3	15 19 5.97	2.1301	13 48 48.7	6.543	3	17 0 47.96	2.1071	17 30 51.4	2.621
4	15 21 13.76	2.1296	13 55 20.2	6.456	4	17 2 54.37	2.1066	17 33 26.1	2.535
5	15 23 21.52	2.1291	14 1 47.0	6.408	5	17 5 0.75	2.1060	17 35 55.6	2.449
6	15 25 29.25	2.1286	14 8 9.2	6.331	6	17 7 7.09	2.1054	17 38 20.0	2.364
7	15 27 36.95	2.1281	14 14 26.7	6.253	7	17 9 13.40	2.1049	17 40 39.3	2.278
8	15 29 44.62	2.1276	14 20 39.6	6.176	8	17 11 19.68	2.1043	17 42 53.4	2.192
9	15 31 52.26	2.1271	14 26 47.8	6.097	9	17 13 25.92	2.1037	17 45 2.4	2.107
10	15 33 59.87	2.1266	14 32 51.3	6.019	10	17 15 32.13	2.1032	17 47 6.3	2.022
11	15 36 7.45	2.1262	14 38 50.1	5.940	11	17 17 38.30	2.1026	17 49 5.0	1.936
12	15 38 15.01	2.1257	14 44 44.1	5.860	12	17 19 44.44	2.1020	17 50 58.6	1.851
13	15 40 22.54	2.1252	14 50 33.3	5.781	13	17 21 50.54	2.1013	17 52 47.1	1.765
14	15 42 30.04	2.1247	14 56 17.8	5.702	14	17 23 56.60	2.1007	17 54 30.4	1.679
15	15 44 37.51	2.1242	15 1 57.5	5.623	15	17 26 2.62	2.1001	17 56 8.6	1.594
16	15 46 44.95	2.1237	15 7 32.4	5.541	16	17 28 8.61	2.0995	17 57 41.7	1.509
17	15 48 52.36	2.1233	15 13 2.4	5.460	17	17 30 14.56	2.0988	17 59 9.7	1.423
18	15 50 59.75	2.1229	15 18 27.6	5.380	18	17 32 20.47	2.0982	18 0 32.5	1.337
19	15 53 7.11	2.1224	15 23 48.0	5.299	19	17 34 26.34	2.0975	18 1 50.2	1.252
20	15 55 14.44	2.1220	15 29 3.5	5.217	20	17 36 32.17	2.0968	18 3 2.8	1.167
21	15 57 21.75	2.1216	15 34 14.1	5.136	21	17 38 37.96	2.0962	18 4 10.2	1.081
22	15 59 29.03	2.1211	15 39 19.8	5.054	22	17 40 43.72	2.0956	18 5 12.5	0.996
23	16 1 36.28	2.1206	S. 15 44 20.6	4.973	23	17 42 49.43	2.0949	S. 18 6 9.7	0.911
MONDAY 14.					WEDNESDAY 16.				
0	16 3 43.50	2.1202	S. 15 49 16.5	4.890	0	17 44 55.10	2.0942	S. 18 7 1.8	0.826
1	16 5 50.70	2.1197	15 54 7.4	4.808	1	17 47 0.73	2.0936	18 7 48.8	0.741
2	16 7 57.87	2.1192	15 58 53.4	4.726	2	17 49 6.32	2.0927	18 8 30.7	0.655
3	16 10 5.01	2.1187	16 3 31.5	4.643	3	17 51 11.86	2.0920	18 9 7.4	0.570
4	16 12 12.12	2.1183	16 8 10.6	4.560	4	17 53 17.36	2.0912	18 9 39.0	0.485
5	16 14 19.21	2.1179	16 12 41.7	4.478	5	17 55 22.81	2.0905	18 10 5.6	0.400
6	16 16 26.27	2.1174	16 17 7.9	4.395	6	17 57 28.22	2.0898	18 10 27.1	0.315
7	16 18 33.30	2.1170	16 21 29.1	4.311	7	17 59 33.59	2.0891	18 10 43.4	0.230
8	16 20 40.31	2.1166	16 25 45.2	4.227	8	18 1 38.91	2.0883	18 10 54.7	0.146
9	16 22 47.29	2.1161	16 29 56.3	4.143	9	18 3 44.18	2.0875	18 11 0.9	- 0.061
10	16 24 54.24	2.1156	16 34 2.4	4.060	10	18 5 49.41	2.0867	18 11 2.0	+ 0.023
11	16 27 1.16	2.1152	16 38 3.5	3.977	11	18 7 54.59	2.0859	18 10 58.1	0.107
12	16 29 8.06	2.1147	16 41 59.6	3.893	12	18 9 59.72	2.0852	18 10 49.1	0.192
13	16 31 14.93	2.1142	16 45 50.6	3.808	13	18 12 4.81	2.0844	18 10 35.1	0.276
14	16 33 21.76	2.1137	16 49 36.5	3.723	14	18 14 9.85	2.0836	18 10 16.0	0.361
15	16 35 28.57	2.1132	16 53 17.4	3.639	15	18 16 14.84	2.0827	18 9 51.8	0.445
16	16 37 35.35	2.1127	16 56 53.2	3.555	16	18 18 19.78	2.0819	18 9 22.6	0.529
17	16 39 42.10	2.1123	17 0 24.0	3.471	17	18 20 24.67	2.0811	18 8 48.4	0.612
18	16 41 48.83	2.1118	17 3 49.7	3.386	18	18 22 29.51	2.0802	18 8 9.1	0.696
19	16 43 55.52	2.1113	17 7 10.3	3.301	19	18 24 34.30	2.0794	18 7 24.8	0.780
20	16 46 2.18	2.1108	17 10 25.8	3.216	20	18 26 39.04	2.0786	18 6 35.5	0.863
21	16 48 8.82	2.1103	17 13 36.2	3.131	21	18 28 43.73	2.0777	18 5 41.3	0.945
22	16 50 15.42	2.1097	17 16 41.5	3.046	22	18 30 48.37	2.0769	18 4 42.1	1.028
23	16 52 21.99	2.1092	17 19 41.7	2.961	23	18 32 52.96	2.0760	18 3 37.9	1.112
24	16 54 28.53	2.1087	S. 17 22 36.8	2.875	24	18 34 57.49	2.0751	S. 18 2 26.6	1.196

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 17.					SATURDAY 19.				
0	18 <sup>h</sup> 34 <sup>m</sup> 57.49 <sup>s</sup>	2.0751	S. 18° 2' 28.6"	1.196	0	20 <sup>h</sup> 13 <sup>m</sup> 28.38 <sup>s</sup>	2.0991	S. 15° 33' 23.7"	4.995
1	18 37 1.97	2.0749	18 1 14.4	1.978	1	20 15 30.10	2.0989	15 28 26.1	4.996
2	18 39 6.40	2.0733	17 59 55.3	1.360	2	20 17 31.76	2.0979	15 23 24.2	5.067
3	18 41 10.77	2.0794	17 58 31.2	1.449	3	20 19 33.36	2.0969	15 18 18.1	5.137
4	18 43 15.09	2.0716	17 57 2.2	1.594	4	20 21 34.91	2.0954	15 13 7.8	5.907
5	18 45 19.36	2.0707	17 55 28.3	1.607	5	20 23 36.41	2.0945	15 7 53.3	5.977
6	18 47 23.57	2.0697	17 53 49.4	1.689	6	20 25 37.85	2.0936	15 2 34.6	5.346
7	18 49 27.73	2.0698	17 52 5.6	1.771	7	20 27 39.24	2.0927	14 57 11.8	5.415
8	18 51 31.83	2.0678	17 50 16.9	1.829	8	20 29 40.57	2.0917	14 51 44.8	5.484
9	18 53 35.87	2.0669	17 48 23.4	1.933	9	20 31 41.85	2.0908	14 46 13.7	5.553
10	18 55 39.86	2.0660	17 46 25.0	2.014	10	20 33 43.07	2.0190	14 40 38.5	5.691
11	18 57 43.79	2.0651	17 44 21.7	2.096	11	20 35 44.24	2.0191	14 34 59.2	5.696
12	18 59 47.67	2.0649	17 42 13.5	2.177	12	20 37 45.36	2.0189	14 29 15.9	5.756
13	19 1 51.49	2.0639	17 40 0.5	2.257	13	20 39 46.43	2.0174	14 23 28.5	5.982
14	19 3 55.26	2.0623	17 37 42.7	2.337	14	20 41 47.45	2.0165	14 17 37.2	5.988
15	19 5 58.97	2.0613	17 35 20.1	2.417	15	20 43 48.41	2.0157	14 11 41.9	5.955
16	19 8 2.62	2.0603	17 32 52.6	2.497	16	20 45 49.33	2.0149	14 5 42.6	6.091
17	19 10 6.21	2.0593	17 30 20.4	2.577	17	20 47 50.20	2.0141	13 59 39.4	6.086
18	19 12 9.74	2.0583	17 27 43.4	2.657	18	20 49 51.02	2.0133	13 53 32.3	6.151
19	19 14 13.21	2.0574	17 25 1.6	2.736	19	20 51 51.79	2.0125	13 47 21.3	6.216
20	19 16 16.63	2.0565	17 22 15.1	2.814	20	20 53 52.52	2.0117	13 41 6.4	6.981
21	19 18 19.99	2.0555	17 19 23.9	2.893	21	20 55 53.20	2.0109	13 34 47.6	6.345
22	19 20 23.29	2.0545	17 16 27.9	2.973	22	20 57 53.83	2.0109	13 28 25.0	6.406
23	19 22 26.53	2.0535	S. 17° 13' 27.2"	3.051	23	20 59 54.42	2.0095	S. 13° 21' 58.7"	6.470
FRIDAY 18.					SUNDAY 20.				
0	19 24 29.71	2.0525	S. 17° 10' 21.8"	3.139	0	21 1 54.97	2.0087	S. 13° 15' 28.6"	6.532
1	19 26 32.83	2.0515	17 7 11.7	3.207	1	21 3 55.47	2.0080	13 8 54.8	6.595
2	19 28 35.89	2.0505	17 3 57.0	3.264	2	21 5 55.93	2.0073	13 2 17.2	6.657
3	19 30 38.89	2.0496	17 0 37.6	3.309	3	21 7 56.35	2.0067	12 55 35.9	6.719
4	19 32 41.84	2.0487	16 57 13.6	3.439	4	21 9 56.73	2.0060	12 48 50.9	6.780
5	19 34 44.73	2.0477	16 53 45.0	3.516	5	21 11 57.07	2.0053	12 42 2.3	6.840
6	19 36 47.56	2.0467	16 50 11.7	3.593	6	21 13 57.36	2.0046	12 35 10.1	6.900
7	19 38 50.33	2.0457	16 46 33.8	3.669	7	21 15 57.62	2.0040	12 28 14.3	6.960
8	19 40 53.04	2.0447	16 42 51.4	3.745	8	21 17 57.84	2.0033	12 21 14.9	7.020
9	19 42 55.69	2.0437	16 39 4.4	3.821	9	21 19 58.02	2.0027	12 14 11.9	7.079
10	19 44 58.28	2.0427	16 35 12.9	3.897	10	21 21 58.17	2.0022	12 7 5.4	7.137
11	19 47 0.81	2.0417	16 31 16.8	3.973	11	21 23 58.28	2.0016	11 59 55.5	7.194
12	19 49 3.28	2.0407	16 27 16.2	4.048	12	21 25 58.36	2.0011	11 52 42.1	7.252
13	19 51 5.69	2.0397	16 23 11.1	4.123	13	21 27 58.41	2.0006	11 45 25.2	7.309
14	19 53 8.04	2.0387	16 19 1.5	4.197	14	21 29 58.43	2.0000	11 38 5.0	7.365
15	19 55 10.34	2.0378	16 14 47.5	4.270	15	21 31 58.41	1.9994	11 30 41.4	7.422
16	19 57 12.58	2.0368	16 10 29.1	4.344	16	21 33 58.36	1.9989	11 23 14.4	7.478
17	19 59 14.76	2.0358	16 6 6.2	4.418	17	21 35 58.29	1.9983	11 15 44.1	7.533
18	20 1 16.88	2.0348	16 1 38.9	4.492	18	21 37 58.19	1.9981	11 8 10.5	7.588
19	20 3 18.94	2.0338	15 57 7.2	4.564	19	21 39 58.06	1.9977	11 0 33.6	7.642
20	20 5 20.94	2.0329	15 52 31.2	4.637	20	21 41 57.91	1.9979	10 52 53.5	7.695
21	20 7 22.89	2.0320	15 47 50.8	4.709	21	21 43 57.73	1.9969	10 45 10.2	7.748
22	20 9 24.78	2.0310	15 43 6.1	4.781	22	21 45 57.53	1.9965	10 37 23.7	7.801
23	20 11 26.61	2.0300	15 38 17.1	4.853	23	21 47 57.31	1.9962	10 29 34.0	7.854
24	20 13 28.38	2.0291	S. 15° 33' 23.7"	4.925	24	21 49 57.07	1.9958	S. 10° 21' 41.2"	7.906

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 21.					WEDNESDAY 23.				
0	21 <sup>h</sup> 49 <sup>m</sup> 57.07	1.9958	8.10° 21' 41.2"	7.966	0	23 <sup>h</sup> 25 <sup>m</sup> 49.07	2.0088	S. 3° 13' 2.4"	9.723
1	21 51 56.81	1.9955	10 13 45.3	7.967	1	23 27 49.63	2.0098	2 3 18.3	9.746
2	21 53 56.53	1.9952	10 5 46.4	8.007	2	23 29 50.25	2.0108	2 53 32.9	9.767
3	21 55 56.23	1.9949	9 57 44.4	8.057	3	23 31 50.93	2.0118	2 43 46.3	9.787
4	21 57 55.92	1.9947	9 49 39.5	8.107	4	23 33 51.67	2.0129	2 33 58.5	9.807
5	21 59 55.60	1.9945	9 41 31.6	8.157	5	23 35 52.48	2.0141	2 24 9.5	9.827
6	22 1 55.26	1.9943	9 33 20.7	8.206	6	23 37 53.36	2.0152	2 14 19.3	9.845
7	22 3 54.91	1.9941	9 25 6.9	8.253	7	23 39 54.30	2.0164	2 4 28.1	9.863
8	22 5 54.55	1.9939	9 16 50.3	8.301	8	23 41 55.32	2.0176	1 54 35.8	9.880
9	22 7 54.18	1.9938	9 8 30.8	8.348	9	23 43 56.41	2.0188	1 44 42.5	9.897
10	22 9 53.81	1.9937	9 0 8.5	8.395	10	23 45 57.57	2.0200	1 34 48.2	9.919
11	22 11 53.43	1.9936	8 51 43.4	8.441	11	23 47 58.81	2.0212	1 24 53.0	9.927
12	22 13 53.04	1.9935	8 43 15.6	8.486	12	23 50 0.12	2.0225	1 14 57.0	9.940
13	22 15 52.65	1.9935	8 34 45.1	8.531	13	23 52 1.51	2.0239	1 5 0.2	9.953
14	22 17 52.26	1.9935	8 26 11.9	8.576	14	23 54 2.99	2.0253	0 55 2.6	9.966
15	22 19 51.87	1.9935	8 17 36.0	8.620	15	23 56 4.55	2.0267	0 45 4.2	9.979
16	22 21 51.48	1.9935	8 8 57.5	8.663	16	23 58 6.20	2.0280	0 35 5.1	9.990
17	22 23 51.09	1.9935	8 0 16.5	8.705	17	0 0 7.94	2.0297	0 25 5.4	10.000
18	22 25 50.70	1.9936	7 51 32.9	8.747	18	0 2 9.76	2.0312	0 15 5.1	10.009
19	22 27 50.32	1.9937	7 42 46.8	8.789	19	0 4 11.68	2.0327	S. 0 5 4.3	10.018
20	22 29 49.95	1.9938	7 33 58.2	8.830	20	0 6 13.69	2.0342	N. 0 4 57.0	10.026
21	22 31 49.58	1.9939	7 25 7.2	8.870	21	0 8 15.79	2.0359	0 14 58.8	10.033
22	22 33 49.22	1.9941	7 16 13.8	8.910	22	0 10 17.99	2.0376	0 25 1.0	10.040
23	22 35 48.88	1.9944	7 7 18.0	8.950	23	0 12 20.30	2.0393	N. 0 35 3.6	10.045
TUESDAY 22.					THURSDAY 24.				
0	22 37 48.55	1.9947	S. 6 58 19.8	8.986	0	0 14 22.71	2.0410	N. 0 45 6.4	10.049
1	22 39 48.24	1.9949	6 49 19.4	9.026	1	0 16 25.22	2.0427	0 55 9.5	10.053
2	22 41 47.94	1.9952	6 40 16.7	9.063	2	0 18 27.84	2.0445	1 5 12.8	10.056
3	22 43 47.66	1.9955	6 31 11.8	9.100	3	0 20 30.56	2.0463	1 15 16.2	10.058
4	22 45 47.40	1.9958	6 22 4.7	9.136	4	0 22 33.39	2.0481	1 25 19.7	10.059
5	22 47 47.16	1.9962	6 12 55.5	9.172	5	0 24 36.33	2.0500	1 35 23.3	10.060
6	22 49 46.93	1.9967	6 3 44.1	9.207	6	0 26 39.39	2.0519	1 45 26.9	10.060
7	22 51 46.76	1.9971	5 54 30.7	9.241	7	0 28 42.56	2.0538	1 55 30.5	10.059
8	22 53 46.60	1.9976	5 45 15.2	9.275	8	0 30 45.85	2.0558	2 5 34.0	10.057
9	22 55 46.47	1.9981	5 35 57.7	9.308	9	0 32 49.26	2.0578	2 15 37.3	10.054
10	22 57 46.37	1.9986	5 26 38.3	9.340	10	0 34 52.79	2.0599	2 25 40.4	10.050
11	22 59 46.30	1.9991	5 17 16.9	9.372	11	0 36 56.45	2.0620	2 35 43.3	10.045
12	23 1 46.26	1.9997	5 7 53.6	9.403	12	0 39 0.23	2.0641	2 45 45.8	10.039
13	23 3 46.26	2.0003	4 58 28.5	9.433	13	0 41 4.14	2.0662	2 55 48.0	10.033
14	23 5 46.30	2.0009	4 49 1.6	9.463	14	0 43 8.18	2.0684	3 5 49.8	10.026
15	23 7 46.37	2.0015	4 39 32.9	9.492	15	0 45 12.35	2.0706	3 15 51.1	10.018
16	23 9 46.48	2.0022	4 30 2.5	9.520	16	0 47 16.65	2.0728	3 25 51.9	10.009
17	23 11 46.64	2.0030	4 20 30.5	9.548	17	0 49 21.09	2.0751	3 35 52.2	10.000
18	23 13 46.84	2.0037	4 10 56.8	9.575	18	0 51 25.66	2.0774	3 45 51.9	9.989
19	23 15 47.09	2.0045	4 1 21.5	9.601	19	0 53 30.37	2.0798	3 55 50.9	9.977
20	23 17 47.38	2.0053	3 51 44.7	9.627	20	0 55 35.23	2.0822	4 5 49.2	9.965
21	23 19 47.72	2.0062	3 42 6.3	9.652	21	0 57 40.23	2.0845	4 15 46.7	9.951
22	23 21 48.12	2.0071	3 32 26.4	9.677	22	0 59 45.37	2.0869	4 25 43.3	9.937
23	23 23 48.57	2.0079	3 22 45.1	9.700	23	1 1 50.66	2.0893	4 35 39.1	9.922
24	23 25 49.07	2.0088	S. 3 13 2.4	9.723	24	1 3 56.09	2.0917	N. 4 45 34.0	9.907

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 25.					SUNDAY 27.				
0	<sup>h</sup> 1 <sup>m</sup> 3 <sup>s</sup> 56.09	2.0017	N. 4 45' 34.0"	9.907	0	<sup>h</sup> 2 <sup>m</sup> 47 <sup>s</sup> 42.53	2.9403	N. 12 4' 37.5"	6.018
1	1 6 1.67	2.0043	4 55 27.9	9.909	1	2 49 57.06	2.9438	12 12 36.7	7.955
2	1 8 7.41	2.0069	5 5 20.7	9.971	2	2 52 11.79	2.9473	12 20 32.1	7.891
3	1 10 13.30	2.0095	5 15 12.4	9.959	3	2 54 26.73	2.9507	12 28 23.6	7.896
4	1 12 19.35	2.1091	5 25 2.9	9.939	4	2 56 41.88	2.9543	12 36 11.2	7.780
5	1 14 25.55	2.1047	5 34 52.2	9.819	5	2 58 57.25	2.9579	12 43 54.8	7.899
6	1 16 31.91	2.1073	5 44 40.3	9.791	6	3 1 12.83	2.9614	12 51 34.3	7.894
7	1 18 38.43	2.1101	5 54 27.1	9.767	7	3 3 26.62	2.9649	12 59 9.7	7.556
8	1 20 45.12	2.1198	6 4 12.4	9.743	8	3 5 44.62	2.9684	13 6 41.0	7.466
9	1 22 51.97	2.1155	6 13 56.3	9.719	9	3 8 0.83	2.9719	13 14 8.0	7.415
10	1 24 58.98	2.1163	6 23 38.7	9.694	10	3 10 17.25	2.9755	13 21 30.8	7.344
11	1 27 6.16	2.1911	6 33 19.6	9.668	11	3 12 33.89	2.9790	13 28 49.3	7.971
12	1 29 13.51	2.1939	6 42 58.9	9.641	12	3 14 50.73	2.9824	13 36 3.3	7.197
13	1 31 21.03	2.1968	6 52 36.5	9.613	13	3 17 7.78	2.9860	13 43 12.9	7.192
14	1 33 28.72	2.1997	7 2 12.4	9.584	14	3 19 25.05	2.9896	13 50 18.0	7.047
15	1 35 36.59	2.1396	7 11 46.6	9.554	15	3 21 42.53	2.9931	13 57 18.5	6.970
16	1 37 44.63	2.1356	7 21 18.9	9.529	16	3 24 0.22	2.9966	14 4 14.4	6.893
17	1 39 52.85	2.1384	7 30 49.3	9.499	17	3 26 18.12	2.9991	14 11 5.7	6.816
18	1 42 1.24	2.1414	7 40 17.7	9.457	18	3 28 36.23	2.9936	14 17 52.3	6.737
19	1 44 9.82	2.1445	7 49 44.1	9.403	19	3 30 54.55	2.9971	14 24 34.1	6.657
20	1 46 18.58	2.1475	7 59 8.5	9.369	20	3 33 13.06	2.9105	14 31 11.1	6.575
21	1 48 27.52	2.1505	8 8 30.8	9.353	21	3 35 31.81	2.9139	14 37 43.1	6.493
22	1 50 36.64	2.1536	8 17 50.9	9.317	22	3 37 50.75	2.9174	14 44 10.2	6.410
23	1 52 45.95	2.1567	N. 8 27 8.8	9.978	23	3 40 9.90	2.9208	N. 14 50 32.3	6.397
SATURDAY 26.					MONDAY 28.				
0	1 54 55.45	2.1599	N. 8 36 24.3	9.930	0	3 42 29.25	2.9242	N. 14 56 49.4	6.949
1	1 57 5.14	2.1631	8 45 37.5	9.900	1	3 44 48.81	2.9276	15 3 1.4	6.157
2	1 59 15.02	2.1669	8 54 46.3	9.150	2	3 47 8.57	2.9310	15 9 8.2	6.070
3	2 1 25.08	2.1693	9 3 56.6	9.117	3	3 49 28.53	2.9343	15 15 9.8	5.983
4	2 3 35.34	2.1796	9 13 2.4	9.075	4	3 51 48.69	2.9377	15 21 6.2	5.896
5	2 5 45.79	2.1758	9 22 5.6	9.039	5	3 54 9.05	2.9411	15 26 57.3	5.807
6	2 7 56.44	2.1791	9 31 6.2	8.987	6	3 56 29.62	2.9444	15 32 43.0	5.717
7	2 10 7.28	2.1833	9 40 4.1	8.949	7	3 58 50.38	2.9477	15 38 23.3	5.626
8	2 12 18.32	2.1857	9 48 59.2	8.905	8	4 1 11.34	2.9509	15 43 58.1	5.535
9	2 14 29.56	2.1890	9 57 51.5	8.847	9	4 3 32.49	2.9541	15 49 27.5	5.443
10	2 16 41.00	2.1923	10 6 40.9	8.799	10	4 5 53.83	2.9573	15 54 51.3	5.350
11	2 18 52.64	2.1957	10 15 27.4	8.749	11	4 8 15.37	2.9606	16 0 9.5	5.257
12	2 21 4.48	2.1990	10 24 10.8	8.698	12	4 10 37.10	2.9637	16 5 22.1	5.163
13	2 23 16.52	2.2024	10 32 51.2	8.647	13	4 12 59.02	2.9668	16 10 29.0	5.067
14	2 25 28.77	2.2058	10 41 28.5	8.596	14	4 15 21.12	2.9699	16 15 30.1	4.970
15	2 27 41.22	2.2092	10 50 2.7	8.543	15	4 17 43.41	2.9730	16 20 25.4	4.873
16	2 29 53.87	2.2126	10 58 33.6	8.488	16	4 20 5.88	2.9761	16 25 14.9	4.776
17	2 32 6.73	2.2160	11 7 1.2	8.433	17	4 22 28.54	2.9792	16 29 58.6	4.678
18	2 34 19.79	2.2194	11 15 25.5	8.377	18	4 24 51.38	2.9821	16 34 36.3	4.578
19	2 36 33.06	2.2229	11 23 46.4	8.319	19	4 27 14.39	2.9850	16 39 8.0	4.478
20	2 38 46.54	2.2264	11 32 3.8	8.260	20	4 29 37.58	2.9880	16 43 33.7	4.378
21	2 41 0.23	2.2298	11 40 17.6	8.201	21	4 32 0.95	2.9909	16 47 53.4	4.277
22	2 43 14.12	2.2333	11 48 27.9	8.149	22	4 34 24.49	2.9937	16 52 7.0	4.176
23	2 45 28.22	2.2367	11 56 34.6	8.090	23	4 36 48.20	2.9965	16 56 14.4	4.073
24	2 47 42.53	2.2403	N. 12 4 37.5	8.018	24	4 39 12.07	2.9992	N. 17 0 15.7	3.970

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
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TUESDAY 29.

	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>
0	4 39 12.07	2.3992	N.17 0 15.7	3.979
1	4 41 36.11	2.4090	17 4 10.8	3.886
2	4 44 0.31	2.4047	17 7 59.6	3.781
3	4 46 24.67	2.4073	17 11 42.1	3.656
4	4 48 49.19	2.4099	17 15 18.3	3.550
5	4 51 13.86	2.4125	17 18 48.1	3.443
6	4 53 38.69	2.4151	17 22 11.5	3.337
7	4 56 3.67	2.4175	17 25 28.5	3.229
8	4 58 28.79	2.4199	17 28 39.0	3.121
9	5 0 54.06	2.4223	17 31 43.0	3.012
10	5 3 19.47	2.4247	17 34 40.4	2.903
11	5 5 45.02	2.4270	17 37 31.3	2.793
12	5 8 10.71	2.4292	17 40 15.6	2.682
13	5 10 36.53	2.4314	17 42 53.2	2.572
14	5 13 2.48	2.4335	17 45 24.2	2.461
15	5 15 28.55	2.4356	17 47 48.5	2.349
16	5 17 54.75	2.4377	17 50 6.1	2.237
17	5 20 21.07	2.4397	17 52 16.9	2.124
18	5 22 47.51	2.4417	17 54 20.9	2.011
19	5 25 14.07	2.4436	17 56 18.2	1.897
20	5 27 40.74	2.4453	17 58 8.6	1.783
21	5 30 7.51	2.4470	17 59 52.2	1.669
22	5 32 34.38	2.4487	18 1 28.9	1.554
23	5 35 1.35	2.4503	N.18 2 58.7	1.439

WEDNESDAY 30.

	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>
0	5 37 28.42	2.4520	N.18 4 21.6	1.324
1	5 39 55.59	2.4536	18 5 37.6	1.208
2	5 42 22.85	2.4551	18 6 46.6	1.093
3	5 44 50.20	2.4565	18 7 48.7	0.977
4	5 47 17.63	2.4578	18 8 43.8	0.860
5	5 49 45.14	2.4592	18 9 31.9	0.742
6	5 52 12.73	2.4604	18 10 12.9	0.625
7	5 54 40.39	2.4616	18 10 46.9	0.508
8	5 57 8.12	2.4627	18 11 13.9	0.391
9	5 59 35.92	2.4638	18 11 33.8	0.273
10	6 2 3.78	2.4648	18 11 46.7	0.156
11	6 4 31.70	2.4658	18 11 52.5	+ 0.037
12	6 6 59.68	2.4667	18 11 51.2	- 0.081
13	6 9 27.71	2.4675	18 11 42.8	0.199
14	6 11 55.78	2.4682	18 11 27.3	0.317
15	6 14 23.90	2.4690	18 11 4.8	0.435
16	6 16 52.06	2.4697	18 10 35.1	0.554
17	6 19 20.26	2.4709	18 9 58.3	0.672
18	6 21 48.49	2.4707	18 9 14.4	0.791
19	6 24 16.75	2.4712	18 8 23.4	0.909
20	6 26 45.04	2.4717	18 7 25.3	1.028
21	6 29 13.35	2.4720	18 6 20.0	1.147
22	6 31 41.68	2.4722	18 5 7.6	1.265
23	6 34 10.02	2.4724	18 3 48.2	1.383
24	6 36 38.37	2.4726	N.18 2 21.7	1.502

THURSDAY, OCTOBER 1.

	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>
0	6 36 38.37	2.4726	N.18 2 21.7	1.502

PHASES OF THE MOON.

	<sup>d</sup> <sup>h</sup> <sup>m</sup>
☾ Last Quarter. . . . . Sept.	1 17 14.8
● New Moon . . . . .	8 8 43.2
☽ First Quarter . . . . .	15 18 14.8
○ Full Moon . . . . .	23 19 54.7
☾ Last Quarter. . . . .	30 23 29.1

	<sup>d</sup> <sup>h</sup>
☾ Perigee . . . . . Sept.	6 2.1
☾ Apogee . . . . .	17 22.5

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	Fomalhaut W.	86° 6' 38"	9795	87° 41' 13"	9783	89° 16' 3"	9772	90° 51' 7"	9769
	α Pegasi W.	71 4 26	9701	72 41 5	9685	74 18 5	9680	75 55 26	9654
	α Arietis W.	27 56 33	9609	29 26 43	9533	30 58 20	9573	32 31 13	9590
	SATURN E.	36 31 26	9492	34 50 1	9484	33 8 25	9477	31 26 39	9470
	MARS E.	50 43 47	9670	49 6 27	9661	47 28 55	9659	45 51 10	9643
	Pollux E.	52 52 28	9571	51 12 53	9567	49 33 13	9564	47 53 28	9562
	SUN E.	99 13 5	9748	97 37 29	9737	96 1 38	9735	94 25 31	9713
2	Fomalhaut W.	98 49 39	9719	100 25 53	9713	102 2 16	9707	103 38 46	9703
	α Pegasi W.	84 6 57	9589	85 46 7	9577	87 25 34	9566	89 5 16	9555
	α Arietis W.	40 30 40	9697	42 8 58	9598	43 47 56	9579	45 27 30	9546
	MARS E.	37 39 28	9692	36 0 36	9596	34 21 35	9590	32 42 26	9585
	Pollux E.	39 34 38	9579	37 55 5	9580	36 15 43	9592	34 36 37	9606
	SUN E.	86 21 6	9636	84 43 27	9644	83 5 32	9633	81 27 22	9622
3	α Arietis W.	53 53 21	9442	55 35 55	9496	57 18 53	9410	59 2 14	9394
	Aldebaran W.	19 41 7	9263	21 28 1	9253	23 15 9	9243	25 2 32	9234
	SUN E.	73 12 47	9568	71 33 8	9557	69 53 14	9547	68 13 6	9537
4	α Arietis W.	67 44 11	9298	69 29 29	9317	71 15 3	9307	73 0 52	9296
	Aldebaran W.	34 2 49	9191	35 51 30	9183	37 40 23	9176	39 29 27	9168
	SUN E.	59 49 7	9492	58 7 42	9483	56 26 5	9475	54 44 16	9467
5	α Arietis W.	81 53 8	9260	83 40 7	9255	85 27 14	9249	87 14 27	9245
	Aldebaran W.	48 37 16	9139	50 27 16	9134	52 17 23	9130	54 7 36	9126
	SUN E.	46 12 48	9436	44 30 5	9431	42 47 15	9426	41 4 18	9423
6	α Arietis W.	96 11 46	9236	97 59 20	9236	99 46 54	9237	101 34 26	9240
	Aldebaran W.	63 19 53	9115	65 10 29	9114	67 1 6	9114	68 51 44	9114
	SUN E.	32 28 27	9411	30 45 8	9411	29 1 49	9411	27 18 30	9412
10	SUN W.	21 38 9	9683	23 15 11	9699	24 51 52	9716	26 28 11	9733
	Antares E.	58 53 54	9459	57 11 33	9470	55 29 38	9490	53 48 11	9510
	α Aquilæ E.	107 15 30	9232	105 41 44	9240	104 8 8	9248	102 34 43	9259
11	SUN W.	34 24 5	9290	35 58 7	9238	37 31 45	9256	39 5 0	9275
	Antares E.	45 28 13	9292	43 49 48	9246	42 11 56	9272	40 34 38	9292
	α Aquilæ E.	94 51 15	9292	93 19 24	9238	91 47 53	9254	90 16 42	9271
12	SUN W.	46 45 23	9266	48 16 18	9264	49 46 51	9262	51 17 1	9260
	Spica W.	15 17 33	9206	16 51 53	9792	18 26 31	9786	20 1 17	9785
	Antares E.	32 37 48	9259	31 4 37	9299	29 32 17	9249	28 0 51	9290
	α Aquilæ E.	82 46 21	9065	81 17 28	9065	79 49 0	9106	78 20 58	9198
13	SUN W.	58 42 25	9106	60 10 27	9194	61 38 8	9140	63 5 29	9156
	Spica W.	27 54 10	9218	29 28 14	9298	31 2 5	9238	32 35 43	9249
	Venus W.	24 30 45	9211	25 56 41	9225	27 22 20	9241	28 47 41	9255
	α Aquilæ E.	71 7 35	9246	69 42 20	9271	68 17 35	9297	66 53 20	9325
	Fomalhaut E.	103 29 18	9146	102 2 4	9157	100 35 3	9168	99 8 15	9179
14	SUN W.	70 17 33	9231	71 43 5	9246	73 8 20	9252	74 33 19	9272
	Spica W.	40 20 16	9207	41 52 26	9218	43 24 22	9228	44 56 5	9239
	Venus W.	35 50 7	9398	37 13 46	9242	38 37 9	9355	40 0 17	9368



## GREENWICH MEAN TIME,

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXTh.	P. L. of Diff.
1	Fomalhaut	W.	92° 26' 25"	2752	94° 1' 56"	2743	95° 37' 39"	2734	97° 13' 34"	2726
	α Pegasi	W.	77 33 8	2640	79 11 9	2626	80 49 28	2614	82 28 4	2601
	α Arietis	W.	34 5 15	2773	35 40 18	2731	37 16 16	2693	38 53 5	2659
	SATURN	E.	29 44 44	2465	28 2 41	2460	26 20 32	2457	24 38 18	2455
	MARS	E.	44 13 13	2634	42 35 4	2625	40 56 43	2617	39 18 11	2600
	Pollux	E.	46 13 41	2561	44 33 53	2561	42 54 5	2563	41 14 19	2566
	SUN	E.	92 49 9	2701	91 12 31	2690	89 35 38	2679	87 58 30	2667
2	Fomalhaut	W.	105 15 22	2699	106 52 3	2696	108 28 48	2685	110 5 35	2684
	α Pegasi	W.	90 45 13	2545	92 25 24	2535	94 5 48	2527	95 46 24	2518
	α Arietis	W.	47 7 39	2523	48 48 20	2501	50 29 32	2480	52 11 13	2461
	MARS	E.	31 3 11	2583	29 23 52	2580	27 44 30	2580	26 5 7	2582
	Pollux	E.	32 57 50	2625	31 19 29	2649	29 41 41	2680	28 4 35	2719
	SUN	E.	79 48 57	2611	78 10 17	2600	76 31 22	2589	74 52 12	2578
3	α Arietis	W.	60 45 58	2379	62 30 3	2366	64 14 27	2353	65 59 10	2340
	Aldebaran	W.	26 50 9	2225	28 37 59	2216	30 26 3	2207	32 14 20	2190
	SUN	E.	66 32 44	2527	64 52 9	2518	63 11 21	2509	61 30 20	2500
4	α Arietis	W.	74 46 55	2269	76 33 11	2261	78 19 39	2273	80 6 18	2266
	Aldebaran	W.	41 18 42	2162	43 8 7	2156	44 57 41	2150	46 47 24	2144
	SUN	E.	53 2 17	2460	51 20 8	2454	49 37 50	2448	47 55 23	2442
5	α Arietis	W.	89 1 47	2242	90 49 12	2239	92 36 41	2237	94 24 13	2237
	Aldebaran	W.	55 57 55	2123	57 48 19	2120	59 38 47	2118	61 29 19	2116
	SUN	E.	39 21 16	2419	37 38 9	2417	35 54 58	2415	34 11 44	2412
6	α Arietis	W.	103 21 54	2243	105 9 18	2247	106 56 36	2252	108 43 47	2257
	Aldebaran	W.	70 42 21	2116	72 32 56	2117	74 23 29	2120	76 13 58	2122
	SUN	E.	25 35 12	2413	23 51 56	2415	22 8 43	2418	20 25 34	2422
10	SUN	W.	28 4 7	2750	29 39 41	2767	31 14 52	2785	32 49 40	2802
	Antares	E.	52 7 12	2631	50 26 42	2652	48 46 41	2674	47 7 11	2696
	α Aquilæ	E.	101 1 31	2669	99 28 33	2681	97 55 50	2694	96 23 24	2708
11	SUN	W.	40 37 51	2693	42 10 19	2611	43 42 24	2630	45 14 5	2648
	Antares	E.	38 57 56	2737	37 21 52	2757	35 46 28	2789	34 11 46	2823
	α Aquilæ	E.	88 45 53	2669	87 15 26	2606	85 45 21	2695	84 15 39	2644
12	SUN	W.	52 46 49	2638	54 16 15	2655	55 45 20	2673	57 14 3	2690
	Spica	W.	21 36 4	2788	23 10 48	2793	24 45 25	2800	26 19 53	2808
	Antares	E.	26 30 26	2643	25 1 7	2605	23 33 3	2674	22 6 23	2655
	α Aquilæ	E.	76 53 22	2150	75 26 13	2173	73 59 32	2197	72 33 19	2221
13	SUN	W.	64 32 31	2172	65 59 14	2188	67 25 38	2203	68 51 44	2217
	Spica	W.	34 9 7	2661	35 42 16	2672	37 15 11	2683	38 47 51	2695
	VENUS	W.	30 12 45	2670	31 37 31	2685	33 2 0	2700	34 26 12	2714
	α Aquilæ	E.	65 29 37	2359	64 6 26	2381	62 43 47	2410	61 21 42	2440
	Fomalhaut	E.	97 41 41	2191	96 15 21	2204	94 49 16	2215	93 23 25	2228
14	SUN	W.	75 58 3	2285	77 22 32	2297	78 46 47	2310	80 10 47	2321
	Spica	W.	46 27 35	2250	47 58 51	2260	49 29 54	2269	51 0 45	2280
	VENUS	W.	41 23 10	2390	42 45 49	2393	44 8 13	2405	45 30 24	2416

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## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
14	$\alpha$ Aquilæ E.	60° 0' 11"	3473	58° 39' 16"	3505	57° 18' 57"	3539	55° 59' 16"	3576
	Fomalhaut E.	91 57 49	3941	90 32 28	3953	89 7 22	3966	87 42 31	3979
15	Sun W.	81 34 34	3339	82 58 9	3349	84 21 32	3359	85 44 43	3369
	Spica W.	52 31 23	3969	54 1 49	3997	55 32 5	3005	57 2 11	3014
	Venus W.	46 52 22	3437	48 14 8	3438	49 35 42	3447	50 57 5	3457
	$\alpha$ Aquilæ E.	49 31 12	3763	48 15 52	3639	47 1 23	3985	45 47 48	3940
	Fomalhaut E.	80 42 3	3345	79 18 44	3358	77 55 40	3373	76 32 51	3386
	$\alpha$ Pegasi E.	95 23 5	3914	93 57 12	3929	92 31 29	3931	91 5 56	3939
16	Sun W.	92 38 6	3409	94 0 20	3409	95 22 27	3414	96 44 28	3419
	Spica W.	64 30 17	3048	65 59 30	3054	67 28 36	3060	68 57 35	3064
	Venus W.	57 41 30	3497	59 1 58	3504	60 22 18	3509	61 42 32	3515
	Antares W.	20 42 11	3645	22 1 46	3488	23 22 23	3449	24 43 52	3404
	Fomalhaut E.	69 42 43	3455	68 21 29	3471	67 0 32	3486	65 39 52	3501
	$\alpha$ Pegasi E.	84 0 38	3979	82 36 2	3987	81 11 35	3994	79 47 17	3308
17	Sun W.	103 33 10	3438	104 54 43	3441	106 16 13	3443	107 37 41	3445
	Spica W.	76 21 18	3081	77 49 51	3089	79 18 22	3093	80 46 52	3094
	Venus W.	68 22 19	3535	69 42 5	3537	71 1 48	3538	72 21 30	3540
	Antares W.	31 39 57	3989	33 4 22	3974	34 29 4	3961	35 54 1	3948
	Fomalhaut E.	59 0 59	3587	57 42 10	3606	56 23 42	3697	55 5 37	3649
	$\alpha$ Pegasi E.	72 47 52	3337	71 24 23	3344	70 1 2	3351	68 37 49	3358
18	Sun W.	114 24 49	3444	115 46 16	3449	117 7 45	3439	118 29 17	3437
	Spica W.	88 9 11	3083	89 37 41	3089	91 6 12	3080	92 34 46	3078
	Venus W.	78 59 45	3539	80 19 26	3538	81 39 8	3535	82 58 53	3534
	Antares W.	43 2 0	3901	44 28 8	3193	45 54 26	3184	47 20 54	3177
	Fomalhaut E.	48 41 27	3781	47 26 5	3814	46 11 17	3850	44 57 6	3890
	$\alpha$ Pegasi E.	61 43 44	3393	60 21 20	3402	58 59 6	3410	57 37 1	3430
	$\alpha$ Arietis E.	104 41 31	3197	103 15 18	3194	101 49 2	3192	100 22 43	3188
19	Sun W.	125 17 50	3418	126 39 46	3413	128 1 48	3408	129 23 56	3401
	Venus W.	89 38 28	3514	90 58 37	3509	92 18 51	3504	93 39 11	3497
	Antares W.	54 35 31	3138	56 2 54	3130	57 30 27	3199	58 58 10	3114
	Fomalhaut E.	38 57 35	4157	37 48 28	4231	36 40 31	4313	35 33 50	4406
	$\alpha$ Pegasi E.	50 49 28	3477	49 28 38	3492	48 8 5	3538	46 47 50	3526
	$\alpha$ Arietis E.	93 9 57	3167	91 43 8	3169	90 16 13	3157	88 49 12	3151
20	Venus W.	100 22 38	3463	101 43 43	3455	103 4 57	3447	104 26 20	3439
	Antares W.	66 19 11	3079	67 47 55	3064	69 16 49	3055	70 45 54	3046
	$\alpha$ Pegasi E.	40 12 28	3657	38 54 55	3693	37 38 1	3736	36 21 52	3785
	$\alpha$ Arietis E.	81 32 27	3193	80 4 45	3116	78 36 55	3110	77 8 58	3104
	Aldebaran E.	114 20 40	3000	112 50 27	2993	111 20 6	2985	109 49 35	2977
21	Antares W.	78 14 9	2998	79 44 24	2989	81 14 50	2980	82 45 28	2969
	$\alpha$ Aquilæ W.	36 21 21	4408	37 26 35	4398	38 33 29	4199	39 41 56	4108
	$\alpha$ Arietis E.	69 47 18	3073	68 18 35	3066	66 49 44	3060	65 20 46	3055
	Aldebaran E.	102 14 28	2935	100 42 54	2926	99 11 8	2917	97 39 11	2908
22	Antares W.	90 21 47	2990	91 53 40	2910	93 25 46	2900	94 58 5	2891
	$\alpha$ Aquilæ W.	45 43 57	3758	46 59 43	3703	48 16 27	3652	49 34 5	3605
	$\alpha$ Arietis E.	57 54 16	3030	56 24 40	3026	54 55 0	3023	53 25 16	3020

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14	$\alpha$ Aquilæ E.	54° 40' 15"	3618	53° 21' 54"	3651	52° 4' 15"	3693	50° 47' 20"	3737
	Fomalhaut E.	86 17 55	3699	84 53 34	3306	83 29 28	3319	82 5 38	3332
15	SUN W.	87 7 43	3371	88 30 33	3379	89 53 13	3387	91 15 44	3395
	Spica W.	58 32 7	3699	60 1 53	3080	61 31 29	3086	63 0 57	3043
	VENUS W.	52 18 17	3467	53 39 18	3475	55 0 10	3489	56 20 54	3489
	$\alpha$ Aquilæ E.	44 35 9	4001	43 23 30	4006	42 12 55	4137	41 3 29	4914
	Fomalhaut E.	75 10 18	3400	73 48 1	3413	72 25 59	3427	71 4 13	3441
	$\alpha$ Pegasi E.	89 40 33	3847	88 15 20	3856	86 50 17	3864	85 25 23	3871
16	SUN W.	98 6 23	3494	99 28 12	3430	100 49 55	3433	102 11 34	3436
	Spica W.	70 26 29	3668	71 55 18	3079	73 24 2	3075	74 52 42	3078
	VENUS W.	63 2 39	3591	64 22 40	3584	65 42 37	3588	67 2 30	3538
	Antares W.	26 6 4	3373	27 28 51	3347	28 52 8	3395	30 15 51	3305
	Fomalhaut E.	64 19 29	3616	62 59 23	3634	61 39 36	3651	60 20 8	3668
	$\alpha$ Pegasi E.	78 23 8	3309	76 59 7	3316	75 35 14	3393	74 11 29	3330
17	SUN W.	108 59 7	3445	110 20 33	3446	111 41 58	3446	113 3 23	3445
	Spica W.	82 15 21	3085	83 43 49	3086	85 12 16	3086	86 40 43	3085
	VENUS W.	73 41 10	3549	75 0 48	3549	76 20 26	3541	77 40 5	3540
	Antares W.	37 19 13	3937	38 44 38	3998	40 10 14	3918	41 36 2	3900
	Fomalhaut E.	53 47 55	3671	52 30 37	3695	51 13 45	3792	49 57 21	3750
	$\alpha$ Pegasi E.	67 14 44	3365	65 51 47	3379	64 28 58	3379	63 6 17	3386
18	SUN W.	119 50 52	3434	121 12 30	3431	122 34 12	3496	123 55 59	3493
	Spica W.	94 3 23	3075	95 32 3	3079	97 0 47	3089	98 29 35	3064
	VENUS W.	84 18 40	3631	85 38 30	3596	86 58 25	3593	88 18 24	3518
	Antares W.	48 47 31	3169	50 14 17	3169	51 41 12	3153	53 8 17	3146
	Fomalhaut E.	43 43 36	3633	42 30 50	3690	41 18 51	4033	40 7 44	4099
	$\alpha$ Pegasi E.	56 15 7	3430	54 53 24	3439	53 31 52	3451	52 10 33	3463
	$\alpha$ Arietis E.	98 56 20	3184	97 29 52	3180	96 3 19	3176	94 36 41	3171
19	SUN W.	130 46 11	3395	132 8 33	3389	133 31 2	3399	134 53 39	3374
	VENUS W.	94 59 38	3491	96 20 12	3485	97 40 53	3478	99 1 42	3471
	Antares W.	60 26 2	3106	61 54 4	3098	63 22 16	3090	64 50 38	3081
	Fomalhaut E.	34 28 34	4510	33 24 51	4629	32 22 51	4765	31 22 46	4990
	$\alpha$ Pegasi E.	45 27 55	3547	44 8 23	3570	42 49 16	3595	41 30 36	3694
	$\alpha$ Arietis E.	87 22 4	3146	85 54 50	3140	84 27 29	3135	83 0 2	3139
20	VENUS W.	105 47 52	3431	107 9 34	3499	108 31 26	3413	109 53 28	3403
	Antares W.	72 15 10	3037	73 44 37	3097	75 14 16	3018	76 44 7	3009
	$\alpha$ Pegasi E.	35 6 34	3840	33 52 13	3904	32 38 57	3976	31 26 54	4063
	$\alpha$ Arietis E.	75 40 53	3098	74 12 41	3091	72 44 21	3065	71 15 53	3079
	Aldebaran E.	108 18 54	2969	106 48 3	2992	105 17 2	2954	103 45 51	2944
21	Antares W.	84 16 19	2960	85 47 22	2950	87 18 38	2940	88 50 6	2930
	$\alpha$ Aquilæ W.	40 51 50	4026	42 3 4	3951	43 15 33	3881	44 29 12	3817
	$\alpha$ Arietis E.	63 51 41	3050	62 22 30	3044	60 53 12	3038	59 23 47	3034
	Aldebaran E.	96 7 2	2998	94 34 41	2998	93 2 7	2979	91 29 21	2969
22	Antares W.	96 30 36	2980	98 3 20	2971	99 36 16	2961	101 9 25	2951
	$\alpha$ Aquilæ W.	50 52 34	3561	52 11 51	3519	53 31 54	3480	54 52 40	3444
	$\alpha$ Arietis E.	51 55 28	3018	50 25 38	3016	48 55 47	3017	47 25 56	3018

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22	Aldebaran E.	89° 56' 23"	9859	88° 23' 12"	9849	86° 49' 48"	9838	85° 16' 10"	9828
23	α Aquilæ W.	56 14 7	3409	57 36 13	3378	58 58 55	3348	60 22 11	3319
	α Arietis E.	45 56 6	3091	44 26 19	3095	42 56 37	3030	41 27 1	3038
	Aldebaran E.	77 24 43	9777	75 49 45	9767	74 14 34	9757	72 39 9	9747
24	α Aquilæ W.	67 26 20	3197	68 52 33	3176	70 19 11	3156	71 46 13	3137
	Fomalhaut W.	36 44 48	3875	37 58 33	3789	39 13 54	3698	40 30 43	3693
	Aldebaran E.	64 38 42	9806	63 1 56	9806	61 24 57	9776	59 47 45	9806
	SATURN E.	94 10 11	9798	92 34 2	9713	90 57 40	9703	89 21 4	9693
	Pollux E.	108 0 6	9791	106 25 26	9779	104 50 31	9768	103 15 21	9756
25	α Aquilæ W.	79 6 40	3067	80 35 42	3044	82 5 0	3032	83 34 33	3020
	Fomalhaut W.	47 13 12	3339	48 36 47	3368	50 1 13	3346	51 26 28	3308
	α Pegasi W.	32 15 2	3583	33 33 55	3493	34 54 27	3414	36 16 28	3344
	Aldebaran E.	51 38 26	9818	49 59 56	9809	48 21 13	9800	46 42 18	9801
	SATURN E.	81 14 49	9846	79 36 56	9836	77 58 50	9827	76 20 32	9818
	Pollux E.	95 15 58	9705	93 39 25	9696	92 2 40	9687	90 25 42	9678
26	Fomalhaut W.	58 43 2	3054	60 12 8	3030	61 41 44	3006	63 11 49	2984
	α Pegasi W.	43 24 28	3099	44 52 59	3044	46 22 17	3008	47 52 20	2976
	Aldebaran E.	38 24 42	9548	36 44 36	9540	35 4 18	9533	33 23 50	9534
	SATURN E.	68 6 5	9576	66 26 37	9568	64 46 58	9561	63 7 9	9553
	Pollux E.	82 17 58	9637	80 39 53	9629	79 1 37	9622	77 23 12	9615
	MARS E.	96 7 3	9706	94 31 50	9757	92 56 26	9749	91 20 51	9740
27	Fomalhaut W.	70 48 35	2994	72 21 2	2979	73 53 48	2965	75 26 52	2959
	α Pegasi W.	55 31 48	2946	57 5 16	2925	58 39 11	2905	60 13 31	2788
	SATURN E.	54 45 28	2617	53 4 38	2611	51 23 40	2504	49 42 33	2499
	Pollux E.	69 8 57	2586	67 29 43	2581	65 50 22	2577	64 10 56	2573
	MARS E.	83 20 8	2700	81 43 28	2692	80 6 38	2685	78 29 38	2678
	Regulus E.	105 3 12	2492	103 21 47	2484	101 40 11	2477	99 58 25	2470
28	Fomalhaut W.	83 16 3	2799	84 50 32	2791	86 25 12	2782	88 0 3	2775
	α Pegasi W.	68 10 43	2712	69 47 7	2700	71 23 47	2688	73 0 43	2677
	α Arietis W.	25 17 56	3137	26 45 21	3051	28 14 30	2978	29 45 10	2916
	SATURN E.	41 14 59	2472	39 33 7	2467	37 51 8	2464	36 9 4	2460
	Pollux E.	55 52 36	2561	54 12 47	2561	52 32 58	2561	50 53 9	2561
	MARS E.	70 22 15	2644	68 44 20	2638	67 6 16	2638	65 28 4	2635
	Regulus E.	91 27 10	2436	89 44 27	2430	88 1 35	2424	86 18 34	2417
	SUN E.	128 32 32	2753	126 57 2	2746	125 21 23	2739	123 45 35	2733
29	α Pegasi W.	81 8 50	2631	82 47 3	2623	84 25 27	2616	86 4 0	2610
	α Arietis W.	37 35 11	2706	39 11 43	2678	40 48 53	2652	42 26 38	2628
	Pollux E.	42 34 51	2583	40 55 32	2592	39 16 26	2603	37 37 35	2616
	MARS E.	57 15 3	2597	55 36 4	2593	53 56 59	2588	52 17 47	2583
	Regulus E.	77 41 20	2388	75 57 28	2382	74 13 28	2377	72 29 20	2372
	SUN E.	115 44 29	2701	114 7 51	2695	112 31 4	2689	110 54 9	2684
30	α Arietis W.	50 42 31	2538	52 22 52	2523	54 3 33	2510	55 44 32	2498
	MARS E.	44 0 18	2564	42 20 33	2560	40 40 43	2558	39 0 50	2556
	Regulus E.	63 46 49	2346	62 1 57	2341	60 16 58	2337	58 31 52	2333
	SUN E.	102 47 41	2655	101 10 1	2650	99 32 14	2645	97 54 20	2639

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22	Aldebaran	E.	83° 42' 19"	9818	82° 8' 15"	9806	80° 33' 58"	9796	78° 59' 27"	9786
23	α Aquilæ	W.	61 46 0	3992	63 10 21	3985	64 35 13	3949	66 0 33	3919
	α Arietis	E.	39 57 35	3047	38 28 21	3000	36 59 22	3076	35 30 43	3096
	Aldebaran	E.	71 3 31	9736	69 27 39	9725	67 51 33	9716	66 15 14	9706
24	α Aquilæ	W.	73 13 38	3119	74 41 24	3103	76 9 30	3087	77 37 56	3073
	Fomalhaut	W.	41 48 53	3554	43 8 18	3490	44 28 53	3432	45 50 33	3380
	Aldebaran	E.	58 10 19	9856	56 32 40	9846	54 54 48	9837	53 16 43	9828
	SATURN	E.	87 44 15	9684	86 7 13	9674	84 29 58	9664	82 52 30	9655
	Pollux	E.	101 39 56	9746	100 4 17	9735	98 28 24	9725	96 52 18	9715
25	α Aquilæ	W.	85 4 21	3009	86 34 22	2999	88 4 36	2989	89 35 2	2981
	Fomalhaut	W.	52 52 28	3173	54 19 10	3140	55 46 31	3110	57 14 29	3081
	α Pegasi	W.	37 39 49	3280	39 4 24	3223	40 30 6	3179	41 56 49	3125
	Aldebaran	E.	45 3 11	9589	43 23 52	9573	41 44 20	9565	40 4 37	9556
	SATURN	E.	74 42 2	9610	73 3 20	9601	71 24 27	9593	69 45 22	9584
	Pollux	E.	88 48 32	9669	87 11 10	9660	85 33 37	9659	83 55 53	9644
26	Fomalhaut	W.	64 42 22	2963	66 13 21	2944	67 44 44	2927	69 16 29	2910
	α Pegasi	W.	49 23 3	2946	50 54 24	2918	52 26 20	2899	53 58 49	2889
	Aldebaran	E.	31 43 10	9516	30 2 19	9509	28 21 18	9501	26 40 6	9494
	SATURN	E.	61 27 9	9545	59 46 58	9538	58 6 38	9531	56 26 8	9524
	Pollux	E.	75 44 38	9609	74 5 55	9603	72 27 4	9596	70 48 4	9591
	MARS	E.	89 45 4	9733	88 9 6	9723	86 32 57	9716	84 56 38	9707
27	Fomalhaut	W.	77 0 13	2939	78 33 50	2928	80 7 41	2918	81 41 46	2908
	α Pegasi	W.	61 48 15	2771	63 23 21	2754	64 58 49	2739	66 34 37	2725
	SATURN	E.	48 1 18	9493	46 19 55	9487	44 38 24	9482	42 56 45	9477
	Pollux	E.	62 31 24	9570	60 51 48	9566	59 12 7	9564	57 32 23	9562
	MARS	E.	76 52 28	9671	75 15 9	9663	73 37 40	9657	72 0 2	9650
	Regulus	E.	98 16 29	9469	96 34 23	9456	94 52 8	9450	93 9 44	9443
28	Fomalhaut	W.	89 35 3	2769	91 10 11	2764	92 45 26	2759	94 20 48	2755
	α Pegasi	W.	74 37 54	2666	76 15 19	2657	77 52 57	2647	79 30 48	2639
	α Arietis	W.	31 17 8	9863	32 50 14	9816	34 24 21	9775	35 59 22	9738
	SATURN	E.	34 26 55	9456	32 44 42	9455	31 2 26	9454	29 20 8	9453
	Pollux	E.	49 13 21	9564	47 33 36	9566	45 53 55	9570	44 14 19	9576
	MARS	E.	63 49 43	9619	62 11 14	9614	60 32 38	9608	58 53 54	9603
	Regulus	E.	84 35 24	9419	82 52 6	9405	81 8 39	9400	79 25 4	9394
	SUN	E.	122 9 39	9796	120 33 34	9790	118 57 21	9713	117 20 59	9707
29	α Pegasi	W.	87 42 42	2603	89 21 33	2598	91 0 31	2593	92 39 35	2589
	α Arietis	W.	44 4 55	9807	45 43 41	9807	47 22 54	9809	49 2 31	9853
	Pollux	E.	35 59 2	9639	34 20 51	9653	32 43 8	9678	31 5 58	9707
	MARS	E.	50 38 29	9578	48 59 4	9574	47 19 34	9571	45 39 51	9566
	Regulus	E.	70 45 5	9366	69 0 42	9369	67 16 12	9356	65 31 34	9351
	SUN	E.	109 17 7	9678	107 39 57	9672	106 2 39	9666	104 25 14	9660
30	α Arietis	W.	57 25 48	2487	59 7 20	2476	60 49 7	2466	62 31 8	2456
	MARS	E.	37 20 54	2553	35 40 55	2553	34 0 55	2553	32 20 56	2554
	Regulus	E.	56 46 40	9398	55 1 21	9394	53 15 56	9319	51 30 25	9315
	SUN	E.	96 16 18	9635	94 38 10	9639	92 59 55	9625	91 21 34	9620

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Thur.	1	<sup>h</sup> 12 <sup>m</sup> 31 <sup>s</sup> 2.93	9.063	S. 3° 21' 12.3"	-58.23	16' 1.60"	64.38	<sup>m</sup> 10 <sup>s</sup> 26.96	0.793
Frid.	2	12 34 40.59	9.077	3 44 28.6	58.13	16 1.87	64.42	10 45.80	0.778
Sat.	3	12 38 18.58	9.091	4 7 42.4	58.02	16 2.14	64.47	11 4.30	0.764
SUN.	4	12 41 56.94	9.106	4 30 53.4	-57.89	16 2.41	64.52	11 22.44	0.749
Mon.	5	12 45 35.68	9.122	4 54 1.3	57.75	16 2.68	64.58	11 40.20	0.733
Tues.	6	12 49 14.81	9.138	5 17 5.5	57.59	16 2.95	64.64	11 57.58	0.717
Wed.	7	12 52 54.33	9.155	5 40 5.8	-57.42	16 3.23	64.70	12 14.57	0.700
Thur.	8	12 56 34.26	9.173	6 3 1.8	57.23	16 3.50	64.76	12 31.14	0.682
Frid.	9	13 0 14.64	9.192	6 25 53.0	57.03	16 3.78	64.83	12 47.27	0.663
Sat.	10	13 3 55.48	9.212	6 48 39.1	-56.81	16 4.06	64.90	13 2.94	0.643
SUN.	11	13 7 36.80	9.232	7 11 19.7	56.57	16 4.34	64.97	13 18.13	0.623
Mon.	12	13 11 18.61	9.253	7 33 54.4	56.31	16 4.62	65.04	13 32.83	0.602
Tues.	13	13 15 0.91	9.274	7 56 22.8	-56.04	16 4.90	65.12	13 47.04	0.581
Wed.	14	13 18 43.73	9.296	8 18 44.5	55.75	16 5.18	65.20	14 0.74	0.559
Thur.	15	13 22 27.08	9.318	8 40 59.3	55.45	16 5.46	65.28	14 13.91	0.537
Frid.	16	13 26 10.98	9.341	9 3 6.6	-55.12	16 5.74	65.36	14 26.53	0.514
Sat.	17	13 29 55.44	9.365	9 25 5.9	54.79	16 6.02	65.45	14 38.58	0.490
SUN.	18	13 33 40.50	9.390	9 46 57.0	54.45	16 6.30	65.54	14 50.04	0.465
Mon.	19	13 37 26.17	9.415	10 8 39.5	-54.08	16 6.57	65.63	15 0.90	0.440
Tues.	20	13 41 12.45	9.441	10 30 13.0	53.70	16 6.85	65.72	15 11.14	0.414
Wed.	21	13 44 59.37	9.468	10 51 37.2	53.31	16 7.12	65.82	15 20.75	0.387
Thur.	22	13 48 46.95	9.496	11 12 51.6	-52.89	16 7.39	65.92	15 29.71	0.359
Frid.	23	13 52 35.21	9.525	11 33 55.8	52.46	16 7.65	66.02	15 37.98	0.331
Sat.	24	13 56 24.16	9.555	11 54 49.5	52.01	16 7.92	66.12	15 45.56	0.301
SUN.	25	14 0 13.83	9.585	12 15 32.3	-51.55	16 8.18	66.23	15 52.42	0.271
Mon.	26	14 4 4.24	9.616	12 36 3.8	51.07	16 8.44	66.33	15 58.55	0.240
Tues.	27	14 7 55.41	9.647	12 56 23.6	50.57	16 8.69	66.44	16 3.92	0.209
Wed.	28	14 11 47.34	9.679	13 16 31.4	-50.06	16 8.94	66.55	16 8.53	0.177
Thur.	29	14 15 40.04	9.712	13 36 26.9	49.54	16 9.19	66.66	16 12.37	0.144
Frid.	30	14 19 33.53	9.745	13 56 9.4	48.99	16 9.44	66.77	16 15.42	0.111
Sat.	31	14 23 27.83	9.779	14 15 38.5	48.43	16 9.68	66.88	16 17.67	0.077
SUN.	32	14 27 22.95	9.813	S. 14 34 53.9	-47.85	16 9.92	66.99	16 19.10	0.043

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sideral time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.									
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.	
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.				
Thur.	1	<sup>h</sup> 12 <sup>m</sup> 31 <sup>s</sup> 4.52	9.065	S. <sup>°</sup> 3 <sup>'</sup> 21 <sup>"</sup> 22.4	-58.24	<sup>m</sup> 10 <sup>s</sup> 27.08	0.792	<sup>h</sup> 12 <sup>m</sup> 41 <sup>s</sup> 31.60	
Frid.	2	12 34 42.22	9.079	3 44 39.0	58.14	10 45.93	0.778	12 45 28.15	
Sat.	3	12 38 20.26	9.093	4 7 53.1	58.03	11 4.44	0.764	12 49 24.70	
SUN.	4	12 41 58.67	9.108	4 31 4.4	-57.90	11 22.58	0.749	12 53 21.25	
Mon.	5	12 45 37.47	9.124	4 54 12.5	57.76	11 40.34	0.733	12 57 17.81	
Tues.	6	12 49 16.64	9.140	5 17 17.0	57.60	11 57.72	0.717	13 1 14.36	
Wed.	7	12 52 56.20	9.157	5 40 17.5	-57.43	12 14.71	0.700	13 5 10.91	
Thur.	8	12 56 36.17	9.175	6 3 13.7	57.24	12 31.28	0.682	13 9 7.46	
Frid.	9	13 0 16.60	9.194	6 26 5.1	57.04	12 47.41	0.663	13 13 4.01	
Sat.	10	13 3 57.49	9.214	6 48 51.4	-56.82	13 3.08	0.643	13 17 0.57	
SUN.	11	13 7 38.85	9.234	7 11 32.2	56.58	13 18.27	0.623	13 20 57.12	
Mon.	12	13 11 20.70	9.255	7 34 7.1	56.32	13 32.97	0.602	13 24 53.67	
Tues.	13	13 15 3.04	9.276	7 56 35.6	-56.05	13 47.18	0.581	13 28 50.22	
Wed.	14	13 18 45.90	9.298	8 18 57.5	55.76	14 0.88	0.559	13 32 46.78	
Thur.	15	13 22 29.29	9.320	8 41 12.4	55.46	14 14.04	0.537	13 36 43.33	
Frid.	16	13 26 13.23	9.343	9 3 19.8	-55.13	14 26.65	0.514	13 40 39.88	
Sat.	17	13 29 57.73	9.367	9 25 19.2	54.80	14 38.70	0.490	13 44 36.43	
SUN.	18	13 33 42.83	9.392	9 47 10.4	54.45	14 50.16	0.465	13 48 32.99	
Mon.	19	13 37 28.53	9.417	10 8 53.0	-54.08	15 1.01	0.440	13 52 29.54	
Tues.	20	13 41 14.84	9.443	10 30 26.5	53.70	15 11.25	0.414	13 56 26.09	
Wed.	21	13 45 1.79	9.470	10 51 50.8	53.31	15 20.85	0.387	14 0 22.64	
Thur.	22	13 48 49.40	9.498	11 13 5.3	-52.89	15 29.80	0.359	14 4 19.20	
Frid.	23	13 52 37.69	9.526	11 34 9.5	52.46	15 38.06	0.331	14 8 15.75	
Sat.	24	13 56 26.67	9.556	11 55 3.2	52.01	15 45.64	0.301	14 12 12.31	
SUN.	25	14 0 16.37	9.586	12 15 46.0	-51.55	15 52.49	0.271	14 16 8.86	
Mon.	26	14 4 6.80	9.617	12 36 17.5	51.07	15 58.61	0.240	14 20 5.41	
Tues.	27	14 7 57.99	9.648	12 56 37.2	50.57	16 3.97	0.209	14 24 1.96	
Wed.	28	14 11 49.94	9.680	13 16 44.9	-50.06	16 8.57	0.177	14 27 58.51	
Thur.	29	14 15 42.66	9.713	13 36 40.3	49.54	16 12.41	0.144	14 31 55.07	
Frid.	30	14 19 36.17	9.746	13 56 22.7	48.99	16 15.46	0.111	14 35 51.63	
Sat.	31	14 23 30.49	9.780	14 15 51.7	48.43	16 17.69	0.077	14 39 48.18	
SUN.	32	14 27 25.62	9.814	S. 14 35 7.0	-47.85	16 19.11	0.043	14 43 44.73	
NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.								Diff. for 1 Hour, + 0".8565. (Table III.)	

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	274	188° 27' 51.6	27° 15.9	147.69	— 0.52	0.0001822	— 50.8	<sup>h</sup> 11 <sup>m</sup> 16 <sup>s</sup> 37.25
2	275	189 26 57.6	26 21.8	147.79	0.46	0.0000603	50.9	11 12 41.35
3	276	190 26 5.9	25 30.0	147.89	0.40	9.9999380	51.0	11 8 45.44
4	277	191 25 16.5	24 40.5	147.98	— 0.30	9.9998153	— 51.2	11 4 49.53
5	278	192 24 29.4	23 53.3	148.08	0.19	9.9996922	51.4	11 0 53.62
6	279	193 23 44.5	23 8.4	148.17	— 0.06	9.9995687	51.6	10 56 57.72
7	280	194 23 1.9	22 25.7	148.27	+ 0.07	9.9994447	— 51.8	10 53 1.81
8	281	195 22 21.4	21 45.1	148.36	0.21	9.9993203	52.0	10 49 5.90
9	282	196 21 42.9	21 6.5	148.44	0.32	9.9991954	52.2	10 45 9.99
10	283	197 21 6.5	20 30.0	148.52	+ 0.42	9.9990700	— 52.4	10 41 14.09
11	284	198 20 32.0	19 55.4	148.60	0.49	9.9989442	52.5	10 37 18.18
12	285	199 19 59.3	19 22.7	148.68	0.54	9.9988181	52.6	10 33 22.27
13	286	200 19 28.5	18 51.8	148.75	+ 0.56	9.9986920	— 52.6	10 29 26.37
14	287	201 18 59.5	18 22.7	148.83	0.55	9.9985660	52.5	10 25 30.47
15	288	202 18 32.3	17 55.4	148.90	0.51	9.9984401	52.4	10 21 34.56
16	289	203 18 6.8	17 29.8	148.97	+ 0.43	9.9983144	— 52.3	10 17 38.65
17	290	204 17 43.0	17 5.9	149.04	0.34	9.9981891	52.1	10 13 42.74
18	291	205 17 20.9	16 43.7	149.11	0.22	9.9980645	51.8	10 9 46.84
19	292	206 17 0.7	16 23.4	149.19	+ 0.09	9.9979407	— 51.4	10 5 50.93
20	293	207 16 42.3	16 4.9	149.26	— 0.05	9.9978179	51.0	10 1 55.02
21	294	208 16 25.6	15 48.1	149.34	0.19	9.9976962	50.5	9 57 59.12
22	295	209 16 10.7	15 33.1	149.42	— 0.32	9.9975756	— 50.0	9 54 3.22
23	296	210 15 57.7	15 20.0	149.50	0.45	9.9974563	49.4	9 50 7.31
24	297	211 15 46.7	15 8.9	149.58	0.55	9.9973383	48.9	9 46 11.40
25	298	212 15 37.7	14 59.8	149.67	— 0.62	9.9972217	— 48.3	9 42 15.49
26	299	213 15 30.8	14 52.8	149.75	0.67	9.9971064	47.8	9 38 19.59
27	300	214 15 26.0	14 47.9	149.84	0.70	9.9969923	47.3	9 34 23.68
28	301	215 15 23.3	14 45.1	149.93	— 0.68	9.9968794	— 46.8	9 30 27.77
29	302	216 15 22.6	14 44.3	150.02	0.64	9.9967677	46.3	9 26 31.86
30	303	217 15 24.1	14 45.7	150.11	0.58	9.9966572	45.8	9 22 35.95
31	304	218 15 27.8	14 49.3	150.20	0.49	9.9965478	45.4	9 18 40.04
32	305	219 15 33.7	14 55.1	150.28	— 0.39	9.9964393	— 45.1	9 14 44.13
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>th</sup> .								
Diff. for 1 Hour, — 9 <sup>m</sup> .8296, (Table II.)								



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	16' 9.3	16' 11.1	59' 10.6	+ 0.59	59' 17.2	+ 0.50	18 <sup>h</sup> 38.1 <sup>m</sup>	2.39	22.6
2	16 12.6	16 13.7	59 22.6	0.40	59 26.7	+ 0.27	19 35.1	2.35	23.6
3	16 14.4	16 14.6	59 29.2	+ 0.14	59 30.0	- 0.01	20 30.8	2.29	24.6
4	16 14.3	16 13.4	59 28.9	- 0.17	59 25.7	- 0.35	21 24.9	2.22	25.6
5	16 12.0	16 9.9	59 20.4	0.54	59 12.8	0.72	22 17.5	2.16	26.6
6	16 7.2	16 3.9	59 3.0	0.91	58 50.9	1.09	23 8.3	2.12	27.6
7	16 0.1	15 55.7	58 36.7	- 1.26	58 20.6	- 1.41	23 57.3	2.09	28.6
8	15 50.8	15 45.6	58 2.8	1.54	57 43.6	1.64	6		0.2
9	15 40.1	15 34.5	57 23.5	1.70	57 2.7	1.74	0 49.3	2.08	1.2
10	15 28.7	15 23.1	56 41.7	- 1.74	56 20.9	- 1.72	1 39.0	2.07	2.2
11	15 17.6	15 12.3	56 0.6	1.66	55 41.3	1.56	2 28.5	2.06	3.2
12	15 7.4	15 2.9	55 23.3	1.43	55 6.9	1.29	3 17.8	2.04	4.2
13	14 59.0	14 55.6	54 52.4	- 1.12	54 39.9	- 0.94	4 6.6	2.02	5.2
14	14 52.8	14 50.7	54 29.7	0.74	54 22.0	0.54	4 54.8	1.99	6.2
15	14 49.3	14 48.6	54 16.9	- 0.32	54 14.3	- 0.11	5 42.2	1.95	7.2
16	14 48.6	14 49.4	54 14.4	+ 0.11	54 17.1	+ 0.33	6 28.6	1.92	8.2
17	14 50.8	14 52.9	54 22.3	0.55	54 30.1	0.75	7 14.3	1.89	9.2
18	14 55.7	14 59.0	54 40.3	0.93	54 52.6	1.11	7 59.5	1.88	10.2
19	15 2.9	15 7.3	55 6.9	+ 1.27	55 22.9	+ 1.40	8 44.5	1.88	11.2
20	15 12.1	15 17.2	55 40.5	1.51	55 59.2	1.59	9 29.9	1.91	12.2
21	15 22.5	15 27.9	56 18.7	1.64	56 38.7	1.67	10 16.2	1.96	13.2
22	15 33.4	15 38.8	56 58.8	+ 1.66	57 18.6	+ 1.62	11 3.9	2.03	14.2
23	15 44.0	15 49.0	57 37.8	1.56	57 56.0	1.46	11 53.7	2.13	15.2
24	15 53.5	15 57.7	58 12.8	1.34	58 28.1	1.21	12 46.0	2.23	16.2
25	16 1.4	16 4.5	58 41.6	+ 1.05	58 53.1	+ 0.89	13 40.7	2.33	17.2
26	16 7.1	16 9.3	59 2.7	0.73	59 10.5	0.57	14 37.5	2.40	18.2
27	16 10.8	16 11.8	59 16.2	0.40	59 20.0	+ 0.24	15 35.5	2.43	19.2
28	16 12.4	16 12.4	59 21.9	+ 0.09	59 22.1	- 0.04	16 33.7	2.41	20.2
29	16 12.1	16 11.4	59 20.9	- 0.16	59 18.3	0.27	17 30.9	2.35	21.2
30	16 10.3	16 9.0	59 14.4	0.37	59 9.4	0.45	18 26.3	2.27	22.2
31	16 7.3	16 5.4	59 3.4	0.54	58 56.5	0.62	19 19.8	2.19	23.2
32	16 3.3	16 0.9	58 48.6	- 0.69	58 39.8	- 0.77	20 11.5	2.12	24.2

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 1.					SATURDAY 3.				
0	6 36 38.37	2.4796	N.18° 2' 21.7"	1.509	0	8 34 26.26	2.4179	N.14° 39' 30.3"	6.759
1	6 39 6.73	2.4797	18 0 48.0	1.680	1	8 36 51.23	2.4150	14 32 41.9	6.853
2	6 41 35.09	2.4797	17 59 7.3	1.738	2	8 39 16.06	2.4198	14 25 47.9	6.946
3	6 44 3.46	2.4797	17 57 19.5	1.856	3	8 41 40.76	2.4106	14 18 48.4	7.039
4	6 46 31.82	2.4796	17 55 24.6	1.974	4	8 44 5.33	2.4083	14 11 43.3	7.131
5	6 49 0.17	2.4795	17 53 22.6	2.092	5	8 46 29.76	2.4061	14 4 32.7	7.221
6	6 51 28.52	2.4793	17 51 13.5	2.210	6	8 48 54.06	2.4038	13 57 16.8	7.310
7	6 53 56.85	2.4790	17 48 57.4	2.327	7	8 51 18.22	2.4015	13 49 55.5	7.399
8	6 56 25.16	2.4717	17 46 34.3	2.444	8	8 53 42.24	2.3992	13 42 28.9	7.487
9	6 58 53.45	2.4713	17 44 4.1	2.561	9	8 56 6.12	2.3968	13 34 57.0	7.575
10	7 1 21.71	2.4708	17 41 26.9	2.677	10	8 58 29.86	2.3945	13 27 19.9	7.661
11	7 3 49.95	2.4703	17 38 42.8	2.793	11	9 0 53.46	2.3921	13 19 37.7	7.746
12	7 6 18.15	2.4697	17 35 51.7	2.910	12	9 3 16.91	2.3897	13 11 50.4	7.830
13	7 8 46.31	2.4691	17 32 53.6	3.026	13	9 5 40.22	2.3873	13 3 58.1	7.913
14	7 11 14.44	2.4685	17 29 48.6	3.141	14	9 8 3.39	2.3849	12 56 0.8	7.995
15	7 13 42.53	2.4678	17 26 36.7	3.256	15	9 10 26.41	2.3824	12 47 58.7	8.076
16	7 16 10.58	2.4670	17 23 17.9	3.371	16	9 12 49.28	2.3799	12 39 51.7	8.157
17	7 18 38.57	2.4661	17 19 52.2	3.486	17	9 15 12.00	2.3775	12 31 39.9	8.236
18	7 21 6.51	2.4652	17 16 19.6	3.600	18	9 17 34.58	2.3751	12 23 23.4	8.314
19	7 23 34.40	2.4643	17 12 40.2	3.713	19	9 19 57.01	2.3725	12 15 2.2	8.392
20	7 26 2.23	2.4633	17 8 54.0	3.826	20	9 22 19.28	2.3700	12 6 36.4	8.467
21	7 28 29.99	2.4623	17 5 1.1	3.938	21	9 24 41.41	2.3676	11 58 6.1	8.542
22	7 30 57.69	2.4611	17 1 1.4	4.051	22	9 27 3.39	2.3651	11 49 31.4	8.615
23	7 33 25.32	2.4600	N.16 56 55.0	4.164	23	9 29 25.22	2.3626	N.11 40 52.3	8.688
FRIDAY 2.					SUNDAY 4.				
0	7 35 52.89	2.4588	N.16 52 41.8	4.276	0	9 31 46.90	2.3601	N.11 32 8.8	8.761
1	7 38 20.38	2.4575	16 48 21.9	4.386	1	9 34 8.43	2.3576	11 23 21.0	8.839
2	7 40 47.79	2.4560	16 43 55.5	4.495	2	9 36 29.81	2.3551	11 14 29.0	8.901
3	7 43 15.12	2.4548	16 39 22.5	4.605	3	9 38 51.04	2.3526	11 5 32.9	8.960
4	7 45 42.37	2.4535	16 34 42.9	4.714	4	9 41 12.12	2.3500	10 56 32.7	9.037
5	7 48 9.54	2.4521	16 29 56.8	4.823	5	9 43 33.04	2.3474	10 47 28.5	9.103
6	7 50 36.62	2.4506	16 25 4.2	4.931	6	9 45 53.81	2.3449	10 38 20.3	9.169
7	7 53 3.61	2.4491	16 20 5.1	5.038	7	9 48 14.43	2.3424	10 29 8.2	9.233
8	7 55 30.51	2.4475	16 14 59.6	5.145	8	9 50 34.90	2.3399	10 19 52.3	9.296
9	7 57 57.31	2.4458	16 9 47.7	5.252	9	9 52 55.22	2.3374	10 10 32.7	9.357
10	8 0 24.01	2.4442	16 4 29.4	5.357	10	9 55 15.39	2.3349	10 1 9.4	9.418
11	8 2 50.61	2.4425	15 59 4.8	5.462	11	9 57 35.41	2.3323	9 51 42.5	9.478
12	8 5 17.11	2.4407	15 53 34.0	5.566	12	9 59 55.27	2.3298	9 42 12.0	9.537
13	8 7 43.50	2.4389	15 47 56.9	5.670	13	10 2 14.98	2.3273	9 32 38.0	9.594
14	8 10 9.78	2.4373	15 42 13.6	5.773	14	10 4 34.55	2.3249	9 23 0.7	9.650
15	8 12 35.96	2.4355	15 36 24.2	5.874	15	10 6 53.97	2.3224	9 13 20.0	9.706
16	8 15 2.02	2.4334	15 30 28.7	5.976	16	10 9 13.24	2.3199	9 3 36.0	9.760
17	8 17 27.97	2.4316	15 24 27.1	6.077	17	10 11 32.36	2.3175	8 53 48.8	9.812
18	8 19 53.81	2.4297	15 18 19.5	6.177	18	10 13 51.34	2.3151	8 43 58.5	9.863
19	8 22 19.53	2.4276	15 12 5.9	6.276	19	10 16 10.17	2.3126	8 34 5.2	9.914
20	8 24 45.12	2.4255	15 5 46.4	6.373	20	10 18 28.85	2.3102	8 24 8.8	9.964
21	8 27 10.50	2.4235	14 59 21.1	6.470	21	10 20 47.39	2.3077	8 14 9.5	10.012
22	8 29 35.94	2.4214	14 52 50.0	6.567	22	10 23 5.78	2.3053	8 4 7.3	10.059
23	8 32 1.16	2.4193	14 46 13.0	6.664	23	10 25 24.03	2.3029	7 54 2.4	10.104
24	8 34 26.26	2.4172	N.14 39 30.3	6.759	24	10 27 42.13	2.3005	N. 7 43 54.8	10.149

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 5.					WEDNESDAY 7.				
0	<sup>h</sup> 10 <sup>m</sup> 27 <sup>s</sup> 42.13	2.9005	N. 7° 43' 54.8"	10.149	0	<sup>h</sup> 12 <sup>m</sup> 15 <sup>s</sup> 44.52	2.9007	S. 0° 51' 57.1"	10.893
1	10 30 0.09	2.9008	7 33 44.5	10.192	1	12 17 57.06	2.9004	1 2 50.3	10.880
2	10 32 17.91	2.9058	7 23 31.7	10.334	2	12 20 9.53	2.9079	1 13 42.7	10.867
3	10 34 35.59	2.9035	7 13 16.4	10.376	3	12 22 21.92	2.9050	1 24 34.3	10.852
4	10 36 53.13	2.9012	7 2 58.6	10.316	4	12 24 34.24	2.9047	1 35 25.0	10.836
5	10 39 10.53	2.9089	6 52 38.5	10.354	5	12 26 46.48	2.9034	1 46 14.6	10.818
6	10 41 27.79	2.9066	6 42 16.1	10.392	6	12 28 58.65	2.9022	1 57 3.1	10.799
7	10 43 44.92	2.9043	6 31 51.5	10.438	7	12 31 10.75	2.9011	2 7 50.5	10.781
8	10 46 1.91	2.9090	6 21 24.8	10.463	8	12 33 22.78	2.1999	2 18 36.8	10.761
9	10 48 18.76	2.9798	6 10 56.0	10.497	9	12 35 34.74	2.1968	2 29 21.8	10.739
10	10 50 35.48	2.9776	6 0 25.2	10.529	10	12 37 46.64	2.1977	2 40 5.5	10.717
11	10 52 52.07	2.9753	5 49 52.5	10.560	11	12 39 58.47	2.1967	2 50 47.9	10.694
12	10 55 8.52	2.9731	5 39 18.0	10.590	12	12 42 10.24	2.1957	3 1 28.8	10.669
13	10 57 24.84	2.9710	5 28 41.7	10.619	13	12 44 21.95	2.1946	3 12 8.2	10.643
14	10 59 41.04	2.9689	5 18 3.7	10.647	14	12 46 33.59	2.1935	3 22 46.0	10.617
15	11 1 57.11	2.9668	5 7 24.0	10.674	15	12 48 45.17	2.1926	3 33 22.2	10.590
16	11 4 13.05	2.9647	4 56 42.8	10.699	16	12 50 56.70	2.1917	3 43 56.7	10.561
17	11 6 28.87	2.9627	4 46 0.1	10.724	17	12 53 8.17	2.1907	3 54 29.5	10.532
18	11 8 44.57	2.9606	4 35 15.9	10.747	18	12 55 19.58	2.1897	4 5 0.5	10.501
19	11 11 0.14	2.9585	4 24 30.4	10.769	19	12 57 30.94	2.1889	4 15 29.6	10.469
20	11 13 15.59	2.9565	4 13 43.6	10.789	20	12 59 42.25	2.1880	4 25 56.8	10.437
21	11 15 30.92	2.9545	4 2 55.7	10.808	21	13 1 53.50	2.1871	4 36 22.1	10.404
22	11 17 46.13	2.9525	3 52 6.6	10.827	22	13 4 4.70	2.1863	4 46 45.3	10.369
23	11 20 1.22	2.9505	N. 3 41 16.4	10.845	23	13 6 15.86	2.1856	S. 4 57 6.4	10.333
TUESDAY 6.					THURSDAY 8.				
0	11 22 16.19	2.9486	N. 3 30 25.2	10.861	0	13 8 26.97	2.1848	S. 5 7 25.3	10.297
1	11 24 31.05	2.9467	3 19 33.1	10.875	1	13 10 38.03	2.1840	5 17 42.0	10.259
2	11 26 45.80	2.9449	3 8 40.2	10.888	2	13 12 49.05	2.1832	5 27 56.4	10.221
3	11 29 0.44	2.9430	2 57 46.5	10.901	3	13 15 0.02	2.1825	5 38 8.5	10.182
4	11 31 14.96	2.9412	2 46 52.1	10.912	4	13 17 10.95	2.1817	5 48 18.3	10.143
5	11 33 29.38	2.9394	2 35 57.0	10.922	5	13 19 21.83	2.1810	5 58 25.7	10.102
6	11 35 43.69	2.9376	2 25 1.4	10.931	6	13 21 32.67	2.1804	6 8 30.6	10.060
7	11 37 57.89	2.9358	2 14 5.3	10.938	7	13 23 43.47	2.1798	6 18 32.9	10.017
8	11 40 11.99	2.9341	2 3 8.8	10.945	8	13 25 54.24	2.1792	6 28 32.6	9.973
9	11 42 25.98	2.9323	1 52 11.9	10.951	9	13 28 4.97	2.1785	6 38 29.7	9.928
10	11 44 39.87	2.9307	1 41 14.7	10.955	10	13 30 15.66	2.1778	6 48 24.0	9.883
11	11 46 53.66	2.9291	1 30 17.3	10.957	11	13 32 26.31	2.1772	6 58 15.6	9.837
12	11 49 7.36	2.9275	1 19 19.8	10.959	12	13 34 36.93	2.1767	7 8 4.4	9.790
13	11 51 20.96	2.9258	1 8 22.2	10.960	13	13 36 47.51	2.1761	7 17 50.4	9.742
14	11 53 34.46	2.9242	0 57 24.6	10.960	14	13 38 58.06	2.1756	7 27 33.4	9.693
15	11 55 47.87	2.9227	0 46 27.0	10.959	15	13 41 8.58	2.1751	7 37 13.5	9.643
16	11 58 1.18	2.9211	0 35 29.5	10.956	16	13 43 19.07	2.1746	7 46 50.6	9.592
17	12 0 14.40	2.9196	0 24 32.3	10.951	17	13 45 29.53	2.1740	7 56 24.6	9.541
18	12 2 27.53	2.9181	0 13 35.4	10.946	18	13 47 39.95	2.1735	8 5 55.5	9.489
19	12 4 40.57	2.9167	N. 0 2 38.8	10.941	19	13 49 50.35	2.1731	8 15 23.3	9.437
20	12 6 53.53	2.9152	S. 0 8 17.5	10.934	20	13 52 0.72	2.1726	8 24 47.0	9.383
21	12 9 6.40	2.9138	0 19 13.3	10.925	21	13 54 11.06	2.1722	8 34 9.2	9.328
22	12 11 19.19	2.9125	0 30 8.5	10.915	22	13 56 21.38	2.1717	8 43 27.3	9.273
23	12 13 31.90	2.9111	0 41 3.1	10.905	23	13 58 31.67	2.1712	8 52 42.0	9.217
24	12 15 44.52	2.9097	S. 0 51 57.1	10.893	24	14 0 41.93	2.1708	S. 9 1 53.3	9.160

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 9.					SUNDAY 11.				
0	14 0 41.93	2.1708	S. 9 1' 53.3"	9.180	0	15 44 32.31	2.1560	S. 15 4' 4.6"	5.738
1	14 2 52.17	2.1705	9 11 1.2	9.103	1	15 46 41.66	2.1557	15 9 45.8	5.646
2	14 5 2.39	2.1701	9 20 5.6	9.044	2	15 48 50.99	2.1553	15 15 22.1	5.564
3	14 7 12.58	2.1697	9 29 6.5	8.986	3	15 51 0.30	2.1549	15 20 53.5	5.481
4	14 9 22.75	2.1693	9 38 3.9	8.927	4	15 53 9.58	2.1545	15 26 19.9	5.397
5	14 11 32.90	2.1690	9 46 57.7	8.866	5	15 55 18.84	2.1542	15 31 41.2	5.313
6	14 13 43.03	2.1687	9 55 47.8	8.804	6	15 57 28.08	2.1538	15 36 57.5	5.230
7	14 15 53.14	2.1683	10 4 34.2	8.743	7	15 59 37.29	2.1533	15 42 8.8	5.146
8	14 18 3.23	2.1679	10 13 16.9	8.680	8	16 1 46.47	2.1528	15 47 15.0	5.061
9	14 20 13.29	2.1675	10 21 55.8	8.617	9	16 3 55.63	2.1524	15 52 16.1	4.976
10	14 22 23.33	2.1672	10 30 30.9	8.553	10	16 6 4.76	2.1519	15 57 12.1	4.891
11	14 24 33.36	2.1670	10 39 2.2	8.489	11	16 8 13.86	2.1515	16 2 3.0	4.807
12	14 26 43.37	2.1667	10 47 29.6	8.423	12	16 10 22.94	2.1511	16 6 48.9	4.722
13	14 28 53.36	2.1663	10 55 53.0	8.358	13	16 12 31.99	2.1506	16 11 29.6	4.636
14	14 31 3.33	2.1660	11 4 12.5	8.292	14	16 14 41.01	2.1500	16 16 5.2	4.550
15	14 33 13.28	2.1657	11 12 28.0	8.225	15	16 16 49.99	2.1494	16 20 35.6	4.464
16	14 35 23.22	2.1655	11 20 39.5	8.157	16	16 18 58.94	2.1489	16 25 0.9	4.378
17	14 37 33.14	2.1652	11 28 46.9	8.089	17	16 21 7.86	2.1484	16 29 21.0	4.292
18	14 39 43.04	2.1649	11 36 50.2	8.020	18	16 23 16.75	2.1478	16 33 35.9	4.205
19	14 41 52.93	2.1646	11 44 49.3	7.951	19	16 25 25.60	2.1473	16 37 45.6	4.119
20	14 44 2.80	2.1643	11 52 44.3	7.882	20	16 27 34.42	2.1468	16 41 50.1	4.033
21	14 46 12.65	2.1641	12 0 35.1	7.811	21	16 29 43.21	2.1463	16 45 49.5	3.946
22	14 48 22.49	2.1638	12 8 21.6	7.739	22	16 31 51.96	2.1455	16 49 43.6	3.858
23	14 50 32.31	2.1635	S. 12 16 3.8	7.668	23	16 34 0.67	2.1449	S. 16 53 32.5	3.771
SATURDAY 10.					MONDAY 12.				
0	14 52 42.11	2.1632	S. 12 23 41.8	7.596	0	16 36 9.35	2.1443	S. 16 57 16.1	3.684
1	14 54 51.90	2.1630	12 31 15.4	7.523	1	16 38 17.99	2.1437	17 0 54.5	3.597
2	14 57 1.67	2.1627	12 38 44.6	7.450	2	16 40 26.59	2.1430	17 4 27.7	3.509
3	14 59 11.42	2.1624	12 46 9.4	7.377	3	16 42 35.15	2.1423	17 7 55.6	3.422
4	15 1 21.16	2.1622	12 53 29.8	7.302	4	16 44 43.67	2.1416	17 11 18.3	3.334
5	15 3 30.88	2.1619	13 0 45.7	7.227	5	16 46 52.15	2.1409	17 14 35.7	3.246
6	15 5 40.59	2.1616	13 7 57.1	7.152	6	16 49 0.58	2.1402	17 17 47.8	3.158
7	15 7 50.28	2.1613	13 15 4.0	7.077	7	16 51 8.97	2.1395	17 20 54.6	3.070
8	15 9 59.95	2.1611	13 22 6.3	7.001	8	16 53 17.32	2.1387	17 23 56.2	2.982
9	15 12 9.61	2.1608	13 29 4.1	6.925	9	16 55 25.62	2.1380	17 26 52.5	2.894
10	15 14 19.25	2.1605	13 35 57.3	6.848	10	16 57 33.88	2.1372	17 29 43.5	2.806
11	15 16 28.87	2.1602	13 42 45.8	6.770	11	16 59 42.09	2.1364	17 32 29.3	2.718
12	15 18 38.48	2.1600	13 49 29.7	6.693	12	17 1 50.25	2.1356	17 35 9.7	2.629
13	15 20 48.07	2.1597	13 56 8.9	6.614	13	17 3 58.36	2.1348	17 37 44.8	2.542
14	15 22 57.64	2.1593	14 2 43.4	6.536	14	17 6 6.43	2.1341	17 40 14.7	2.454
15	15 25 7.19	2.1590	14 9 13.2	6.457	15	17 8 14.45	2.1332	17 42 39.3	2.366
16	15 27 16.72	2.1587	14 15 38.2	6.377	16	17 10 22.41	2.1323	17 44 58.6	2.277
17	15 29 26.24	2.1585	14 21 58.4	6.298	17	17 12 30.32	2.1314	17 47 12.6	2.189
18	15 31 35.74	2.1582	14 28 13.9	6.218	18	17 14 38.18	2.1305	17 49 21.3	2.101
19	15 33 45.22	2.1578	14 34 24.6	6.137	19	17 16 45.98	2.1296	17 51 24.7	2.013
20	15 35 54.68	2.1575	14 40 30.4	6.056	20	17 18 53.73	2.1287	17 53 22.8	1.924
21	15 38 4.12	2.1572	14 46 31.3	5.974	21	17 21 1.43	2.1278	17 55 15.6	1.837
22	15 40 13.54	2.1568	14 52 27.3	5.893	22	17 23 9.07	2.1268	17 57 3.2	1.749
23	15 42 22.94	2.1564	14 58 18.4	5.811	23	17 25 16.65	2.1258	17 58 45.5	1.661
24	15 44 32.31	2.1560	S. 15 4 4.6	5.728	24	17 27 24.17	2.1249	S. 18 0 22.5	1.573

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 13.					THURSDAY 15.				
0	17 <sup>h</sup> 27 <sup>m</sup> 24.17	2.1949	S. 18° 0' 22.5"	1.572	0	19 <sup>h</sup> 8 <sup>m</sup> 3.08	2.0853	S. 17° 36' 37.2"	2.497
1	17 29 31.64	2.1940	18 1 54.2	1.484	1	19 10 6.96	2.0839	17 34 5.0	2.577
2	17 31 39.05	2.1939	18 3 20.6	1.397	2	19 12 10.75	2.0826	17 31 28.0	2.657
3	17 33 46.39	2.1918	18 4 41.8	1.309	3	19 14 14.46	2.0811	17 28 46.2	2.736
4	17 35 53.67	2.1908	18 5 57.7	1.221	4	19 16 18.08	2.0807	17 25 50.7	2.814
5	17 38 0.89	2.1198	18 7 8.3	1.133	5	19 18 21.62	2.0883	17 23 8.5	2.893
6	17 40 8.05	2.1187	18 8 13.7	1.046	6	19 20 25.08	2.0869	17 20 12.5	2.972
7	17 42 15.14	2.1177	18 9 13.8	0.958	7	19 22 28.45	2.0855	17 17 11.8	3.050
8	17 44 22.17	2.1167	18 10 8.7	0.871	8	19 24 31.74	2.0841	17 14 6.5	3.128
9	17 46 29.14	2.1156	18 10 58.3	0.783	9	19 26 34.94	2.0827	17 10 56.5	3.206
10	17 48 36.04	2.1144	18 11 42.7	0.696	10	19 28 38.06	2.0813	17 7 41.8	3.283
11	17 50 42.87	2.1133	18 12 21.8	0.609	11	19 30 41.10	2.0499	17 4 22.5	3.360
12	17 52 49.64	2.1122	18 12 55.8	0.523	12	19 32 44.05	2.0485	17 0 58.6	3.437
13	17 54 56.34	2.1110	18 13 24.6	0.436	13	19 34 46.92	2.0471	16 57 30.1	3.513
14	17 57 2.96	2.1098	18 13 48.1	0.349	14	19 36 49.71	2.0457	16 53 57.0	3.589
15	17 59 9.52	2.1087	18 14 6.4	0.262	15	19 38 52.41	2.0443	16 50 19.4	3.665
16	18 1 16.01	2.1076	18 14 19.5	0.175	16	19 40 55.03	2.0430	16 46 37.2	3.741
17	18 3 22.43	2.1064	18 14 27.4	0.089	17	19 42 57.57	2.0417	16 42 50.5	3.816
18	18 5 28.77	2.1051	18 14 30.2	- 0.003	18	19 45 0.03	2.0403	16 38 59.3	3.891
19	18 7 35.04	2.1039	18 14 27.8	+ 0.083	19	19 47 2.41	2.0389	16 35 3.6	3.966
20	18 9 41.24	2.1027	18 14 20.2	0.169	20	19 49 4.70	2.0375	16 31 3.4	4.040
21	18 11 47.37	2.1015	18 14 7.5	0.255	21	19 51 6.91	2.0362	16 26 58.8	4.114
22	18 13 53.42	2.1002	18 13 49.6	0.341	22	19 53 9.04	2.0349	16 22 49.7	4.188
23	18 15 59.40	2.0990	S. 18 13 26.6	0.426	23	19 55 11.10	2.0336	S. 16 18 36.2	4.262
WEDNESDAY 14.					FRIDAY 16.				
0	18 18 5.30	2.0977	S. 18 12 58.5	0.511	0	19 57 13.07	2.0322	S. 16 14 18.3	4.335
1	18 20 11.12	2.0964	18 12 25.3	0.596	1	19 59 14.96	2.0309	16 9 56.0	4.407
2	18 22 16.87	2.0952	18 11 47.0	0.682	2	20 1 16.78	2.0297	16 5 29.4	4.480
3	18 24 22.54	2.0939	18 11 3.5	0.767	3	20 3 18.52	2.0283	16 0 58.4	4.552
4	18 26 28.13	2.0926	18 10 15.0	0.851	4	20 5 20.18	2.0270	15 56 23.1	4.624
5	18 28 33.65	2.0913	18 9 21.4	0.935	5	20 7 21.76	2.0257	15 51 43.5	4.696
6	18 30 39.09	2.0900	18 8 22.8	1.019	6	20 9 23.27	2.0245	15 46 59.6	4.767
7	18 32 44.45	2.0887	18 7 19.1	1.103	7	20 11 24.70	2.0232	15 42 11.5	4.837
8	18 34 49.73	2.0873	18 6 10.4	1.187	8	20 13 26.06	2.0220	15 37 19.1	4.908
9	18 36 54.93	2.0860	18 4 56.7	1.271	9	20 15 27.34	2.0208	15 32 22.5	4.978
10	18 39 0.05	2.0846	18 3 37.9	1.354	10	20 17 28.55	2.0196	15 27 21.7	5.048
11	18 41 5.09	2.0833	18 2 14.2	1.437	11	20 19 29.69	2.0184	15 22 16.7	5.117
12	18 43 10.04	2.0818	18 0 45.5	1.520	12	20 21 30.76	2.0172	15 17 7.6	5.187
13	18 45 14.91	2.0806	17 59 11.8	1.603	13	20 23 31.75	2.0159	15 11 54.3	5.256
14	18 47 19.71	2.0793	17 57 33.2	1.685	14	20 25 32.67	2.0148	15 6 36.9	5.324
15	18 49 24.42	2.0779	17 55 49.6	1.767	15	20 27 33.53	2.0137	15 1 15.4	5.392
16	18 51 29.05	2.0765	17 54 1.1	1.849	16	20 29 34.32	2.0126	14 55 49.8	5.460
17	18 53 33.60	2.0751	17 52 7.7	1.931	17	20 31 35.04	2.0114	14 50 20.2	5.527
18	18 55 38.06	2.0737	17 50 9.3	2.013	18	20 33 35.69	2.0103	14 44 46.6	5.594
19	18 57 42.44	2.0723	17 48 6.1	2.094	19	20 35 36.27	2.0092	14 39 8.9	5.661
20	18 59 46.74	2.0709	17 45 58.0	2.176	20	20 37 36.79	2.0080	14 33 27.2	5.727
21	19 1 50.95	2.0695	17 43 45.0	2.257	21	20 39 37.25	2.0072	14 27 41.6	5.793
22	19 3 55.08	2.0681	17 41 27.2	2.337	22	20 41 37.65	2.0061	14 21 52.0	5.859
23	19 5 59.12	2.0667	17 39 4.6	2.417	23	20 43 37.98	2.0050	14 15 58.5	5.924
24	19 8 3.08	2.0653	S. 17 36 37.2	2.497	24	20 45 38.25	2.0040	S. 14 10 1.1	5.989

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 17.					MONDAY 19.				
0	<sup>h</sup> 20 <sup>m</sup> 45 <sup>s</sup> 38.25	2.0040	S. 14° 10' 1.1"	5.969	0	<sup>h</sup> 22 <sup>m</sup> 21 <sup>s</sup> 5.08	1.9830	S. 8° 15' 17.2"	8.626
1	20 47 38.46	2.0030	14 3 59.8	6.054	1	22 23 4.07	1.9832	8 6 38.3	8.670
2	20 49 38.61	2.0021	13 57 54.6	6.118	2	22 25 3.07	1.9835	7 57 56.8	8.713
3	20 51 38.71	2.0012	13 51 45.6	6.182	3	22 27 2.09	1.9838	7 49 12.7	8.756
4	20 53 38.75	2.0003	13 45 32.8	6.245	4	22 29 1.13	1.9842	7 40 26.1	8.799
5	20 55 38.73	1.9993	13 39 16.2	6.308	5	22 31 0.20	1.9847	7 31 36.9	8.841
6	20 57 38.65	1.9983	13 32 55.8	6.371	6	22 32 59.29	1.9851	7 22 45.2	8.882
7	20 59 38.52	1.9974	13 26 31.7	6.433	7	22 34 58.41	1.9856	7 13 51.1	8.922
8	21 1 38.34	1.9966	13 20 3.9	6.495	8	22 36 57.56	1.9860	7 4 54.6	8.962
9	21 3 38.11	1.9957	13 13 32.3	6.557	9	22 38 56.73	1.9865	6 55 55.7	9.002
10	21 5 37.83	1.9949	13 6 57.1	6.618	10	22 40 55.94	1.9871	6 46 54.4	9.042
11	21 7 37.50	1.9942	13 0 18.2	6.678	11	22 42 55.18	1.9877	6 37 50.7	9.081
12	21 9 37.13	1.9934	12 53 35.7	6.738	12	22 44 54.46	1.9883	6 28 44.7	9.118
13	21 11 36.71	1.9927	12 46 49.6	6.798	13	22 46 53.78	1.9890	6 19 36.5	9.155
14	21 13 36.25	1.9919	12 39 59.9	6.858	14	22 48 53.14	1.9897	6 10 26.1	9.192
15	21 15 35.74	1.9912	12 33 6.6	6.917	15	22 50 52.55	1.9905	6 1 13.5	9.228
16	21 17 35.19	1.9905	12 26 9.8	6.976	16	22 52 52.00	1.9913	5 51 58.8	9.264
17	21 19 34.60	1.9898	12 19 9.5	7.034	17	22 54 51.50	1.9920	5 42 41.9	9.299
18	21 21 33.97	1.9892	12 12 5.7	7.092	18	22 56 51.04	1.9928	5 33 22.9	9.333
19	21 23 33.30	1.9886	12 4 58.4	7.150	19	22 58 50.64	1.9937	5 24 1.9	9.367
20	21 25 32.60	1.9881	11 57 47.7	7.207	20	23 0 50.29	1.9947	5 14 38.9	9.401
21	21 27 31.87	1.9876	11 50 33.6	7.263	21	23 2 50.00	1.9956	5 5 13.8	9.434
22	21 29 31.11	1.9870	11 43 16.1	7.320	22	23 4 49.76	1.9966	4 55 46.8	9.466
23	21 31 30.31	1.9864	S. 11 35 55.2	7.376	23	23 6 49.59	1.9977	S. 4 46 17.9	9.497
SUNDAY 18.					TUESDAY 20.				
0	21 33 29.48	1.9859	S. 11 28 31.0	7.431	0	23 8 49.48	1.9987	S. 4 36 47.2	9.527
1	21 35 28.62	1.9855	11 21 3.5	7.486	1	23 10 49.44	1.9998	4 27 14.7	9.558
2	21 37 27.74	1.9851	11 13 32.7	7.540	2	23 12 49.46	2.0009	4 17 40.3	9.588
3	21 39 26.83	1.9847	11 5 58.7	7.594	3	23 14 49.55	2.0021	4 8 4.1	9.617
4	21 41 25.90	1.9843	10 58 21.4	7.649	4	23 16 49.71	2.0033	3 58 26.2	9.645
5	21 43 24.95	1.9840	10 50 40.8	7.703	5	23 18 49.95	2.0046	3 48 46.7	9.673
6	21 45 23.98	1.9837	10 42 57.0	7.756	6	23 20 50.26	2.0059	3 39 5.5	9.700
7	21 47 22.99	1.9834	10 35 10.1	7.808	7	23 22 50.65	2.0073	3 29 22.7	9.727
8	21 49 21.98	1.9831	10 27 20.1	7.859	8	23 24 51.12	2.0086	3 19 38.3	9.753
9	21 51 20.96	1.9828	10 19 27.0	7.911	9	23 26 51.68	2.0100	3 9 52.4	9.777
10	21 53 19.92	1.9827	10 11 30.8	7.962	10	23 28 52.32	2.0114	3 0 5.0	9.803
11	21 55 18.88	1.9826	10 3 31.6	8.012	11	23 30 53.05	2.0128	2 50 16.2	9.828
12	21 57 17.83	1.9824	9 55 29.4	8.062	12	23 32 53.86	2.0143	2 40 26.0	9.848
13	21 59 16.77	1.9823	9 47 24.2	8.112	13	23 34 54.77	2.0159	2 30 34.4	9.871
14	22 1 15.70	1.9822	9 39 16.0	8.162	14	23 36 55.77	2.0175	2 20 41.5	9.892
15	22 3 14.63	1.9822	9 31 4.8	8.211	15	23 38 56.87	2.0192	2 10 47.3	9.913
16	22 5 13.56	1.9821	9 22 50.7	8.258	16	23 40 58.07	2.0208	2 0 51.9	9.933
17	22 7 12.48	1.9820	9 14 33.8	8.305	17	23 42 59.37	2.0225	1 50 55.3	9.953
18	22 9 11.40	1.9821	9 6 14.1	8.352	18	23 45 0.77	2.0243	1 40 57.5	9.972
19	22 11 10.33	1.9822	8 57 51.5	8.400	19	23 47 2.28	2.0261	1 30 58.6	9.991
20	22 13 9.26	1.9823	8 49 26.1	8.447	20	23 49 3.90	2.0278	1 20 58.6	10.008
21	22 15 8.20	1.9824	8 40 57.9	8.493	21	23 51 5.62	2.0297	1 10 57.6	10.025
22	22 17 7.15	1.9826	8 32 27.0	8.538	22	23 53 7.46	2.0316	1 0 55.6	10.041
23	22 19 6.11	1.9828	8 23 53.4	8.582	23	23 55 9.41	2.0335	0 50 52.7	10.055
24	22 21 5.08	1.9830	S. 8 15 17.2	8.626	24	23 57 11.48	2.0355	S. 0 40 49.0	10.069

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 21.					FRIDAY 23.				
0	23 57 11.48	2.0355	S. 0 40' 49.0"	10.069	0	1 37 51.27	2.1717	N. 7 23' 5.5"	9.738
1	23 59 13.67	2.0375	0 30 44.4	10.063	1	1 40 1.68	2.1752	7 32 48.9	9.708
2	0 1 15.98	2.0396	0 20 39.0	10.067	2	1 42 12.30	2.1788	7 42 30.5	9.677
3	0 3 18.42	2.0417	0 10 32.8	10.108	3	1 44 23.14	2.1825	7 52 10.1	9.643
4	0 5 20.98	2.0438	S. 0 0 26.0	10.119	4	1 46 34.20	2.1862	8 1 47.7	9.609
5	0 7 23.67	2.0459	N. 0 9 41.5	10.130	5	1 48 45.48	2.1899	8 11 23.2	9.574
6	0 9 26.49	2.0481	0 19 49.6	10.140	6	1 50 56.99	2.1936	8 20 56.6	9.538
7	0 11 29.44	2.0503	0 29 58.3	10.149	7	1 53 8.72	2.1973	8 30 27.8	9.509
8	0 13 32.53	2.0526	0 40 7.5	10.157	8	1 55 20.67	2.2010	8 39 56.8	9.463
9	0 15 35.75	2.0548	0 50 17.1	10.164	9	1 57 32.84	2.2048	8 49 23.4	9.423
10	0 17 39.11	2.0572	1 0 27.1	10.170	10	1 59 45.24	2.2086	8 58 47.6	9.383
11	0 19 42.62	2.0597	1 10 37.5	10.176	11	2 1 57.87	2.2123	9 8 9.4	9.349
12	0 21 46.27	2.0621	1 20 48.2	10.181	12	2 4 10.72	2.2161	9 17 28.7	9.309
13	0 23 50.07	2.0646	1 30 59.2	10.185	13	2 6 23.80	2.2199	9 26 45.4	9.266
14	0 25 54.02	2.0670	1 41 10.4	10.187	14	2 8 37.11	2.2238	9 35 59.4	9.211
15	0 27 58.11	2.0695	1 51 21.7	10.189	15	2 10 50.65	2.2277	9 45 10.7	9.165
16	0 30 2.36	2.0721	2 1 33.1	10.191	16	2 13 4.43	2.2316	9 54 19.2	9.118
17	0 32 6.76	2.0747	2 11 44.6	10.192	17	2 15 18.44	2.2354	10 3 24.9	9.070
18	0 34 11.32	2.0773	2 21 56.1	10.191	18	2 17 32.68	2.2393	10 12 27.6	9.020
19	0 36 16.04	2.0800	2 32 7.5	10.190	19	2 19 47.15	2.2432	10 21 27.3	8.970
20	0 38 20.92	2.0827	2 42 18.9	10.188	20	2 22 1.86	2.2471	10 30 24.0	8.919
21	0 40 25.97	2.0855	2 52 30.1	10.184	21	2 24 16.80	2.2510	10 39 17.6	8.867
22	0 42 31.18	2.0882	3 2 41.0	10.180	22	2 26 31.98	2.2549	10 48 8.0	8.813
23	0 44 36.56	2.0910	N. 3 12 51.7	10.176	23	2 28 47.39	2.2588	N. 10 56 55.1	8.758
THURSDAY 22.					SATURDAY 24.				
0	0 46 42.10	2.0938	N. 3 23 2.1	10.170	0	2 31 3.04	2.2626	N. 11 5 38.9	8.709
1	0 48 47.82	2.0967	3 33 12.1	10.163	1	2 33 18.93	2.2667	11 14 19.3	8.645
2	0 50 53.71	2.0997	3 43 21.7	10.156	2	2 35 35.05	2.2707	11 22 56.3	8.587
3	0 52 59.78	2.1027	3 53 30.8	10.147	3	2 37 51.41	2.2746	11 31 29.7	8.527
4	0 55 6.03	2.1057	4 3 39.3	10.137	4	2 40 8.00	2.2785	11 39 59.5	8.467
5	0 57 12.46	2.1087	4 13 47.2	10.127	5	2 42 24.83	2.2825	11 48 25.7	8.406
6	0 59 19.07	2.1117	4 23 54.5	10.116	6	2 44 41.90	2.2864	11 56 48.2	8.343
7	1 1 25.86	2.1148	4 34 1.1	10.103	7	2 46 59.20	2.2903	12 5 6.9	8.279
8	1 3 32.84	2.1179	4 44 6.9	10.089	8	2 49 16.74	2.2943	12 13 21.7	8.214
9	1 5 40.01	2.1211	4 54 11.8	10.074	9	2 51 34.52	2.2982	12 21 32.6	8.148
10	1 7 47.37	2.1242	5 4 15.8	10.059	10	2 53 52.53	2.3022	12 29 39.5	8.082
11	1 9 54.92	2.1274	5 14 18.9	10.043	11	2 56 10.78	2.3062	12 37 42.4	8.013
12	1 12 2.66	2.1307	5 24 21.0	10.026	12	2 58 29.27	2.3101	12 45 41.1	7.943
13	1 14 10.60	2.1339	5 34 22.0	10.007	13	3 0 47.99	2.3140	12 53 35.6	7.873
14	1 16 18.73	2.1372	5 44 21.9	9.988	14	3 3 6.95	2.3179	13 1 25.9	7.802
15	1 18 27.06	2.1405	5 54 20.6	9.968	15	3 5 26.14	2.3217	13 9 11.9	7.730
16	1 20 35.59	2.1439	6 4 18.1	9.947	16	3 7 45.56	2.3256	13 16 53.5	7.656
17	1 22 44.33	2.1473	6 14 14.3	9.925	17	3 10 5.21	2.3295	13 24 30.6	7.581
18	1 24 53.27	2.1507	6 24 9.1	9.901	18	3 12 25.10	2.3334	13 32 3.2	7.505
19	1 27 2.42	2.1542	6 34 2.4	9.877	19	3 14 45.22	2.3373	13 39 31.2	7.428
20	1 29 11.77	2.1576	6 43 54.3	9.852	20	3 17 5.57	2.3410	13 46 54.6	7.351
21	1 31 21.33	2.1611	6 53 44.6	9.825	21	3 19 26.14	2.3448	13 54 13.3	7.272
22	1 33 31.10	2.1646	7 3 33.3	9.797	22	3 21 46.94	2.3486	14 1 27.2	7.192
23	1 35 41.08	2.1681	7 13 20.3	9.768	23	3 24 7.97	2.3523	14 8 36.3	7.111
24	1 37 51.27	2.1717	N. 7 23 5.5	9.738	24	3 26 29.22	2.3561	N. 14 15 40.5	7.028

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 25.					TUESDAY 27.				
0	3 26 29.22	2.3561	N.14° 15' 40.5"	7.098	0	5 23 11.63	2.4679	N.18° 0' 58.9"	2.068
1	3 28 50.70	2.3598	14 22 39.7	6.945	1	5 25 40.90	2.4685	18 2 59.4	1.949
2	3 31 12.40	2.3635	14 29 33.9	6.861	2	5 28 10.25	2.4697	18 4 52.8	1.830
3	3 33 34.32	2.3679	14 36 23.0	6.776	3	5 30 39.67	2.4908	18 6 39.0	1.710
4	3 35 56.46	2.3708	14 43 7.0	6.690	4	5 33 9.15	2.4918	18 8 18.0	1.590
5	3 38 18.82	2.3744	14 49 45.8	6.603	5	5 35 38.69	2.4929	18 9 49.8	1.471
6	3 40 41.39	2.3780	14 56 19.3	6.514	6	5 38 8.30	2.4939	18 11 14.5	1.351
7	3 43 4.18	2.3816	15 2 47.5	6.425	7	5 40 37.96	2.4947	18 12 31.9	1.230
8	3 45 27.18	2.3859	15 9 10.3	6.335	8	5 43 7.66	2.4954	18 13 42.1	1.109
9	3 47 50.40	2.3887	15 15 27.7	6.244	9	5 45 37.41	2.4963	18 14 45.0	0.988
10	3 50 13.82	2.3921	15 21 39.6	6.151	10	5 48 7.20	2.4968	18 15 40.7	0.867
11	3 52 37.45	2.3955	15 27 45.9	6.057	11	5 50 37.03	2.4974	18 16 29.1	0.746
12	3 55 1.28	2.3989	15 33 46.5	5.963	12	5 53 6.89	2.4979	18 17 10.2	0.624
13	3 57 25.32	2.4022	15 39 41.5	5.869	13	5 55 36.77	2.4983	18 17 44.0	0.503
14	3 59 49.55	2.4055	15 45 30.8	5.773	14	5 58 6.68	2.4987	18 18 10.5	0.389
15	4 2 13.98	2.4088	15 51 14.3	5.677	15	6 0 36.61	2.4989	18 18 29.8	0.261
16	4 4 38.61	2.4121	15 56 52.0	5.579	16	6 3 6.55	2.4990	18 18 41.8	0.138
17	4 7 3.43	2.4153	16 2 23.8	5.481	17	6 5 36.49	2.4991	18 18 46.4	+ 0.016
18	4 9 28.44	2.4184	16 7 49.7	5.382	18	6 8 6.44	2.4993	18 18 43.7	- 0.106
19	4 11 53.64	2.4215	16 13 9.6	5.281	19	6 10 36.39	2.4991	18 18 33.7	0.287
20	4 14 19.02	2.4246	16 18 23.4	5.180	20	6 13 6.33	2.4990	18 18 16.4	0.349
21	4 16 44.59	2.4276	16 23 31.2	5.078	21	6 15 36.27	2.4989	18 17 51.8	0.471
22	4 19 10.33	2.4305	16 28 32.8	4.975	22	6 18 6.20	2.4987	18 17 19.9	0.593
23	4 21 36.25	2.4334	N.16° 33' 28.2"	4.873	23	6 20 36.11	2.4983	N.18° 16' 40.8"	0.714
MONDAY 26.					WEDNESDAY 28.				
0	4 24 2.34	2.4363	N.16° 38' 17.4"	4.767	0	6 23 5.99	2.4978	N.18° 15' 54.3"	0.836
1	4 26 28.60	2.4391	16 43 0.3	4.669	1	6 25 35.84	2.4973	18 15 0.5	0.957
2	4 28 55.03	2.4419	16 47 36.9	4.557	2	6 28 5.67	2.4969	18 13 59.5	1.077
3	4 31 21.63	2.4447	16 52 7.1	4.450	3	6 30 35.47	2.4963	18 12 51.2	1.198
4	4 33 48.39	2.4473	16 56 30.9	4.349	4	6 33 5.23	2.4956	18 11 35.7	1.319
5	4 36 15.30	2.4498	17 0 48.2	4.234	5	6 35 34.94	2.4948	18 10 12.9	1.440
6	4 38 42.36	2.4523	17 4 59.0	4.136	6	6 38 4.60	2.4939	18 8 42.9	1.560
7	4 41 9.57	2.4548	17 9 3.3	4.017	7	6 40 34.21	2.4930	18 7 5.7	1.680
8	4 43 36.93	2.4573	17 13 1.0	3.906	8	6 43 3.76	2.4920	18 5 21.3	1.800
9	4 46 4.44	2.4597	17 16 52.0	3.795	9	6 45 33.25	2.4910	18 3 29.7	1.920
10	4 48 32.09	2.4619	17 20 36.4	3.684	10	6 48 2.68	2.4900	18 1 30.9	2.039
11	4 50 59.87	2.4641	17 24 14.1	3.573	11	6 50 32.05	2.4899	17 59 25.0	2.158
12	4 53 27.78	2.4663	17 27 45.0	3.459	12	6 53 1.35	2.4877	17 57 11.9	2.277
13	4 55 55.82	2.4684	17 31 9.2	3.346	13	6 55 30.57	2.4863	17 54 51.7	2.395
14	4 58 23.99	2.4705	17 34 26.6	3.233	14	6 57 59.71	2.4849	17 52 24.5	2.513
15	5 0 52.28	2.4724	17 37 37.1	3.118	15	7 0 28.76	2.4836	17 49 50.2	2.631
16	5 3 20.68	2.4743	17 40 40.7	3.003	16	7 2 57.73	2.4820	17 47 8.8	2.748
17	5 5 49.19	2.4763	17 43 37.4	2.888	17	7 5 26.60	2.4804	17 44 20.4	2.864
18	5 8 17.82	2.4780	17 46 27.2	2.773	18	7 7 55.38	2.4788	17 41 25.1	2.980
19	5 10 46.55	2.4797	17 49 10.0	2.655	19	7 10 24.06	2.4779	17 38 22.8	3.096
20	5 13 15.38	2.4813	17 51 45.8	2.538	20	7 12 52.64	2.4755	17 35 13.6	3.219
21	5 15 44.31	2.4829	17 54 14.6	2.422	21	7 15 21.12	2.4737	17 31 57.4	3.337
22	5 18 13.33	2.4844	17 56 36.4	2.305	22	7 17 49.49	2.4718	17 28 34.3	3.441
23	5 20 42.44	2.4858	17 58 51.2	2.187	23	7 20 17.74	2.4699	17 25 4.4	3.554
24	5 23 11.63	2.4873	N.18° 0' 58.9"	2.068	24	7 22 45.88	2.4680	N.17° 21' 27.8"	3.667



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
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THURSDAY 29.

0	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup>
0	7 22 45.88	2.4680	N.17 21' 27.8	3.667
1	7 25 13.90	2.4680	17 17 44.4	3.780
2	7 27 41.80	2.4640	17 13 54.2	3.892
3	7 30 9.58	2.4619	17 9 57.3	4.004
4	7 32 37.23	2.4597	17 5 53.7	4.115
5	7 35 4.75	2.4575	17 1 43.5	4.225
6	7 37 32.13	2.4552	16 57 26.7	4.335
7	7 39 59.37	2.4529	16 53 3.3	4.444
8	7 42 26.48	2.4506	16 48 33.4	4.552
9	7 44 53.45	2.4483	16 43 57.1	4.659
10	7 47 20.27	2.4457	16 39 14.3	4.767
11	7 49 46.94	2.4433	16 34 25.1	4.873
12	7 52 13.47	2.4408	16 29 29.5	4.979
13	7 54 39.84	2.4382	16 24 27.6	5.083
14	7 57 6.06	2.4357	16 19 19.5	5.187
15	7 59 32.13	2.4331	16 14 5.2	5.290
16	8 1 58.04	2.4304	16 8 44.7	5.393
17	8 4 23.78	2.4277	16 3 18.0	5.496
18	8 6 49.36	2.4250	15 57 45.2	5.597
19	8 9 14.78	2.4222	15 52 6.4	5.697
20	8 11 40.03	2.4194	15 46 21.6	5.796
21	8 14 5.11	2.4167	15 40 30.9	5.894
22	8 16 30.03	2.4138	15 34 34.3	5.992
23	8 18 54.77	2.4109	N 15 28 31.8	6.089

FRIDAY 30.

0	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup>
0	8 21 19.34	2.4081	N.15 22' 23.6	6.185
1	8 23 43.74	2.4059	15 16 9.6	6.281
2	8 26 7.96	2.4032	15 9 49.9	6.375
3	8 28 32.00	2.3999	15 3 24.6	6.468
4	8 30 55.86	2.3969	14 56 53.7	6.561
5	8 33 19.55	2.3933	14 50 17.3	6.652
6	8 35 43.06	2.3903	14 43 35.4	6.743
7	8 38 6.38	2.3872	14 36 48.1	6.833
8	8 40 29.52	2.3842	14 29 55.4	6.923
9	8 42 52.48	2.3811	14 22 57.4	7.011
10	8 45 15.25	2.3780	14 15 54.1	7.097
11	8 47 37.84	2.3750	14 8 45.7	7.183
12	8 50 0.25	2.3719	14 1 32.2	7.268
13	8 52 22.47	2.3688	13 54 13.6	7.353
14	8 54 44.50	2.3657	13 46 49.9	7.437
15	8 57 6.35	2.3626	13 39 21.2	7.519
16	8 59 28.01	2.3594	13 31 47.6	7.601
17	9 1 49.48	2.3562	13 24 9.1	7.681
18	9 4 10.76	2.3531	13 16 25.9	7.760
19	9 6 31.85	2.3500	13 8 37.9	7.839
20	9 8 52.76	2.3469	13 0 45.2	7.916
21	9 11 13.48	2.3437	12 52 48.0	7.992
22	9 13 34.01	2.3406	12 44 46.2	8.068
23	9 15 54.35	2.3375	12 36 39.9	8.143
24	9 18 14.51	2.3344	N.12 28' 29.1	8.217

SATURDAY 31.

0	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup>
0	9 18 14.51	2.3344	N.12 28' 29.1	8.217
1	9 20 34.48	2.3319	12 20 13.9	8.290
2	9 22 54.26	2.3291	12 11 54.4	8.360
3	9 25 13.85	2.3260	12 3 30.7	8.430
4	9 27 33.26	2.3219	11 55 2.8	8.500
5	9 29 52.48	2.3188	11 46 30.7	8.568
6	9 32 11.52	2.3157	11 37 54.6	8.635
7	9 34 30.37	2.3127	11 29 14.5	8.702
8	9 36 49.04	2.3097	11 20 30.4	8.767
9	9 39 7.53	2.3066	11 11 42.4	8.832
10	9 41 25.83	2.3035	11 2 50.6	8.896
11	9 43 43.95	2.3005	10 53 55.0	8.957
12	9 46 1.89	2.2975	10 44 55.7	9.018
13	9 48 19.65	2.2945	10 35 52.8	9.078
14	9 50 37.23	2.2915	10 26 46.3	9.137
15	9 52 54.63	2.2886	10 17 36.3	9.195
16	9 55 11.86	2.2857	10 8 22.9	9.252
17	9 57 28.91	2.2827	9 59 6.1	9.308
18	9 59 45.78	2.2798	9 49 45.9	9.363
19	10 2 2.48	2.2769	9 40 22.5	9.417
20	10 4 19.01	2.2741	9 30 55.9	9.469
21	10 6 35.37	2.2719	9 21 26.2	9.521
22	10 8 51.56	2.2684	9 11 53.4	9.572
23	10 11 7.58	2.2656	N. 9 2 17.6	9.621

SUNDAY, NOVEMBER 1.

0	10 13 23.43	2.2628	N. 8 52' 38.9	9.669
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PHASES OF THE MOON.

		<sup>d</sup> <sup>h</sup> <sup>m</sup>
● New Moon	. October	7 19 31.4
☾ First Quarter	. . .	15 13 20.6
○ Full Moon	. . . .	23 9 22.6
☾ Last Quarter.	. . . .	30 5 57.8

		<sup>d</sup> <sup>h</sup>
☾ Perigee.	. . . October	3 11.1
☾ Apogee.	. . . . .	15 17.6
☾ Perigee.	. . . . .	28 7.7

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Arietis W.	64 13 23	2448	65 55 50	2440	67 38 28	2432	69 21 17	2424
	Aldebaran W.	30 24 52	2302	32 10 48	2298	33 56 51	2294	35 43 0	2290
	Mars E.	30 40 58	2555	29 1 1	2558	27 21 8	2563	25 41 22	2569
	Regulus E.	49 44 48	2311	47 59 5	2308	46 13 17	2304	44 27 24	2301
	Sun E.	89 43 6	2615	88 4 32	2611	86 25 52	2607	84 47 6	2603
2	$\alpha$ Arietis W.	77 57 45	2396	79 41 26	2391	81 25 14	2387	83 9 8	2383
	Aldebaran W.	44 35 7	2272	46 21 48	2268	48 8 34	2266	49 55 24	2262
	Regulus E.	35 36 52	2288	33 50 35	2287	32 4 16	2285	30 17 55	2285
	Sun E.	76 31 52	2583	74 52 34	2580	73 13 11	2577	71 33 44	2574
3	Aldebaran W.	58 50 33	2251	60 37 45	2249	62 24 59	2249	64 12 14	2248
	Saturn W.	29 14 3	2309	30 59 50	2302	32 45 46	2297	34 31 50	2292
	Sun E.	63 15 35	2563	61 35 49	2561	59 56 0	2559	58 16 9	2559
4	Aldebaran W.	73 8 46	2246	74 56 5	2247	76 43 23	2247	78 30 40	2249
	Saturn W.	43 23 30	2280	45 9 59	2279	46 56 30	2278	48 43 2	2278
	Pollux W.	31 21 34	2568	31 1 13	2559	34 41 32	2515	36 22 25	2494
	Sun E.	49 56 43	2559	48 16 51	2559	46 37 0	2580	44 57 10	2561
5	Aldebaran W.	87 26 25	2261	89 13 22	2264	91 0 15	2268	92 47 2	2271
	Saturn W.	57 35 27	2285	59 21 48	2288	61 8 5	2291	62 54 18	2294
	Pollux W.	44 52 39	2432	46 35 28	2436	48 18 26	2421	50 1 31	2417
	Sun E.	36 38 46	2576	34 59 18	2580	33 19 56	2585	31 40 41	2591
9	Sun W.	15 11 23	2207	16 43 33	2217	18 15 30	2228	19 47 13	2240
	Antares E.	37 40 22	2719	36 4 7	2747	34 28 30	2777	32 53 32	2810
	$\alpha$ Aquilæ E.	87 33 42	2273	86 2 55	2269	84 32 28	2265	83 2 21	2262
10	Sun W.	27 21 41	3009	28 51 42	3025	30 21 24	3039	31 50 48	3055
	$\alpha$ Aquilæ E.	75 37 19	3119	74 9 32	3140	72 42 11	3163	71 15 17	3187
	Fomalhaut E.	108 1 59	3059	106 32 59	3067	105 4 9	3076	103 35 30	3085
11	Sun W.	39 13 13	3129	40 40 48	3143	42 8 5	3158	43 35 5	3173
	$\alpha$ Aquilæ E.	64 8 10	3318	62 44 19	3348	61 21 3	3379	59 58 22	3411
	Fomalhaut E.	96 15 10	3138	94 47 47	3150	93 20 38	3162	91 53 43	3174
12	Sun W.	50 45 49	3242	52 11 9	3254	53 36 14	3267	55 1 4	3280
	$\alpha$ Aquilæ E.	53 14 38	3597	51 56 0	3641	50 38 10	3687	49 21 9	3735
	Fomalhaut E.	84 43 5	3243	83 17 47	3258	81 52 46	3272	80 28 2	3287
13	Sun W.	62 1 41	3338	63 25 9	3348	64 48 25	3358	66 11 30	3366
	Venus W.	22 17 38	3590	23 36 23	3592	24 55 17	3576	26 14 17	3573
	$\alpha$ Aquilæ E.	43 9 57	4036	41 58 53	4112	40 49 3	4124	39 40 31	4122
	Fomalhaut E.	73 28 46	3365	72 5 50	3381	70 43 12	3398	69 20 53	3415
	$\alpha$ Pegasi E.	87 57 51	3209	86 31 52	3219	85 6 5	3226	83 40 31	3240
14	Sun W.	73 4 23	3408	74 26 30	3415	75 48 30	3421	77 10 23	3427
	Venus W.	32 49 49	3570	34 8 56	3571	35 28 2	3573	36 47 6	3575
	Antares W.	27 52 7	3307	29 16 10	3289	30 40 34	3274	32 5 16	3260
	Fomalhaut E.	62 34 18	3505	61 14 1	3527	59 54 7	3548	58 34 36	3569
	$\alpha$ Pegasi E.	76 35 37	3269	75 11 13	3289	73 47 0	3309	72 22 59	3319

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
1	$\alpha$ Arietis W.	71° 4' 17"	9418	72° 47' 26"	9419	74° 30' 44"	9405	76° 14' 11"	9400
	Aldebaran W.	37 29 14	9388	39 15 34	9388	41 2 0	9379	42 48 31	9375
	Mars E.	24 1 45	9578	22 22 20	9591	20 43 12	9608	19 4 28	9638
	Regulus E.	42 41 26	9398	40 55 24	9395	39 9 17	9392	37 23 6	9390
2	Sun E.	83 8 14	9598	81 29 16	9594	79 50 13	9591	78 11 5	9587
	$\alpha$ Arietis W.	84 53 7	9380	86 37 11	9377	88 21 19	9374	90 5 31	9372
	Aldebaran W.	51 42 19	9380	53 29 17	9358	55 16 19	9356	57 3 24	9353
	Regulus E.	28 31 34	9385	26 45 13	9368	24 58 53	9388	23 12 36	9391
3	Sun E.	69 54 13	9571	68 14 38	9569	66 35 0	9566	64 55 19	9564
	Aldebaran W.	65 59 30	9347	67 46 47	9346	69 34 6	9345	71 21 26	9345
	Saturn W.	36 18 1	9389	38 4 17	9385	39 50 38	9383	41 37 3	9381
	Sun E.	56 36 17	9558	54 56 24	9557	53 16 30	9557	51 36 36	9558
4	Aldebaran W.	80 17 55	9350	82 5 8	9353	83 52 17	9355	85 39 23	9358
	Saturn W.	50 29 34	9378	52 16 6	9379	54 2 36	9381	55 49 3	9383
	Pollux W.	38 3 47	9477	39 45 33	9462	41 27 39	9450	43 10 2	9441
	Sun E.	43 17 22	9564	41 37 37	9566	39 57 56	9569	38 18 19	9573
5	Aldebaran W.	94 33 44	9276	96 20 19	9281	98 6 46	9288	99 53 6	9291
	Saturn W.	64 40 26	9398	66 26 28	9393	68 12 23	9397	69 58 12	9313
	Pollux W.	51 44 41	9415	53 27 55	9413	55 11 11	9413	56 54 27	9414
	Sun E.	30 1 33	9596	28 22 33	9599	26 43 41	9609	25 4 58	9616
9	Sun W.	21 18 41	9954	22 49 52	9967	24 20 46	9981	25 51 22	9995
	Antares E.	31 19 17	9846	29 45 49	9887	28 13 13	9931	26 41 34	9981
	$\alpha$ Aquilæ E.	81 32 35	3039	80 3 10	3057	78 34 8	3078	77 5 31	3098
10	Sun W.	33 19 53	3069	34 48 40	3084	36 17 9	3099	37 45 20	3114
	$\alpha$ Aquilæ E.	69 48 52	3911	68 22 56	3936	66 57 30	3982	65 32 34	3989
	Fomalhaut E.	102 7 2	3094	100 38 45	3104	99 10 40	3114	97 42 48	3136
11	Sun W.	45 1 47	3187	46 28 12	3200	47 54 21	3214	49 20 13	3228
	$\alpha$ Aquilæ E.	58 36 18	3445	57 14 52	3480	55 54 6	3517	54 34 1	3555
	Fomalhaut E.	90 27 3	3188	89 0 39	3201	87 34 31	3215	86 8 40	3229
12	Sun W.	56 25 39	3293	57 49 59	3304	59 14 6	3315	60 38 0	3328
	$\alpha$ Aquilæ E.	48 4 59	3788	46 49 44	3843	45 35 26	3903	44 22 9	3967
	Fomalhaut E.	79 3 35	3308	77 39 26	3317	76 15 34	3333	74 52 1	3349
13	Sun W.	67 34 25	3375	68 57 10	3385	70 19 44	3393	71 42 8	3401
	Venus W.	27 33 21	3571	28 52 27	3570	30 11 34	3569	31 30 42	3570
	$\alpha$ Aquilæ E.	38 33 22	4380	37 27 43	4488	36 23 40	4607	35 21 21	4739
	Fomalhaut E.	67 58 54	3433	66 37 15	3451	65 15 56	3469	63 54 57	3487
	$\alpha$ Pegasi E.	82 15 9	3250	80 49 59	3259	79 25 0	3270	78 0 13	3279
14	Sun W.	78 32 9	3439	79 53 49	3437	81 15 24	3440	82 36 55	3445
	Venus W.	38 6 8	3576	39 25 9	3576	40 44 9	3577	42 3 8	3577
	Antares W.	33 30 14	3949	34 55 25	3939	36 20 48	3931	37 46 21	3923
	Fomalhaut E.	57 15 28	3592	55 56 45	3615	54 38 27	3640	53 20 36	3667
	$\alpha$ Pegasi E.	70 59 9	3398	69 35 30	3398	68 12 2	3347	66 48 45	3353

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
15	SUN W.	83° 58' 21"	3447	85° 19' 44"	3450	86° 41' 4"	3453	88° 2' 21"	3454
	VENUS W.	43 22 7	3578	44 41 5	3578	46 0 3	3578	47 19 1	3577
	Antares W.	39 12 3	3916	40 37 53	3909	42 3 51	3903	43 29 57	3197
	Fomalhaut E.	52 3 14	3694	50 46 21	3794	49 29 59	3755	48 14 10	3790
	α Pegasi E.	65 25 40	3367	64 2 46	3378	62 40 4	3388	61 17 34	3398
16	SUN W.	94 48 33	3454	96 9 49	3453	97 31 6	3450	98 52 26	3447
	VENUS W.	53 54 9	3569	55 13 17	3568	56 32 28	3563	57 51 43	3558
	Antares W.	50 42 5	3170	52 8 50	3164	53 35 42	3158	55 2 41	3153
	Fomalhaut E.	42 4 51	4007	40 53 18	4063	39 42 40	4136	38 33 3	4195
	α Pegasi E.	54 28 7	3457	53 6 55	3471	51 45 58	3485	50 25 17	3501
	α Arietis E.	97 2 27	3190	95 36 6	3188	94 9 43	3186	92 43 17	3183
17	SUN W.	105 40 4	3498	107 1 51	3490	108 23 45	3414	109 45 46	3408
	VENUS W.	64 29 14	3533	65 49 2	3535	67 8 58	3519	68 29 1	3511
	Antares W.	62 19 24	3119	63 47 10	3113	65 15 4	3105	66 43 8	3097
	α Pegasi E.	43 46 47	3604	42 28 17	3631	41 10 16	3699	39 52 48	3695
	α Arietis E.	85 30 6	3163	84 3 13	3159	82 36 15	3153	81 9 10	3148
18	SUN W.	116 37 53	3367	118 0 47	3358	119 23 52	3348	120 47 8	3338
	VENUS W.	75 11 33	3468	76 32 33	3457	77 53 45	3447	79 15 8	3437
	Antares W.	74 5 57	3053	75 35 4	3043	77 4 23	3034	78 33 54	3023
	α Arietis E.	73 52 5	3118	72 24 17	3119	70 56 22	3105	69 28 19	3098
	Aldebaran E.	106 26 2	2988	104 55 34	2979	103 24 55	2970	101 54 5	2962
19	SUN W.	127 46 28	3283	129 10 59	3271	130 35 44	3259	132 0 44	3247
	VENUS W.	86 5 12	3379	87 27 53	3365	88 50 49	3353	90 13 59	3339
	Antares W.	86 4 46	2989	87 35 38	2958	89 6 44	2946	90 38 5	2934
	α Aquilæ W.	42 19 0	3963	43 31 16	3993	44 44 43	3988	45 59 16	3768
	α Arietis E.	62 5 56	3064	60 37 2	3057	59 8 0	3051	57 38 50	3045
	Aldebaran E.	94 16 48	2909	92 44 40	2897	91 12 17	2885	89 39 39	2873
20	VENUS W.	97 13 42	3273	98 38 26	3258	100 3 27	3244	101 28 44	3230
	α Aquilæ E.	52 26 30	3591	53 46 31	3490	55 7 18	3441	56 28 48	3404
	α Arietis E.	50 11 17	3021	48 41 30	3018	47 11 40	3016	45 41 47	3016
	Aldebaran E.	81 52 35	2811	80 18 21	2798	78 43 50	2785	77 9 2	2771
21	α Aquilæ W.	63 26 13	3944	64 51 30	3916	66 17 20	3190	67 43 41	3164
	Fomalhaut W.	33 25 55	4179	34 34 48	4041	35 45 47	3993	36 58 43	3819
	α Arietis E.	38 12 55	3040	36 43 32	3053	35 14 25	3069	33 45 38	3091
	Aldebaran E.	69 10 35	2704	67 34 0	2680	65 57 6	2676	64 19 54	2663
	SATURN E.	99 18 33	2714	97 42 12	2701	96 5 33	2687	94 28 35	2672
22	α Aquilæ W.	75 2 42	3059	76 31 50	3034	78 1 21	3015	79 31 15	2997
	Fomalhaut W.	43 27 39	3429	44 49 31	3393	46 12 31	3306	47 36 35	3255
	α Pegasi W.	28 47 35	3856	30 1 39	3723	31 18 2	3605	32 36 31	3501
	Aldebaran E.	56 9 19	2595	54 30 17	2589	52 50 57	2569	51 11 19	2556
	SATURN E.	86 19 8	2605	84 40 20	2592	83 1 14	2579	81 21 50	2566
23	Fomalhaut W.	54 50 42	3049	56 19 54	3015	57 49 48	2985	59 20 20	2956
	α Pegasi W.	39 34 3	3131	41 1 35	3077	42 30 13	3029	43 59 50	2984
	Aldebaran E.	42 48 48	2485	41 7 28	2483	39 25 51	2471	37 43 57	2460

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
15	SUN W.	89° 23' 36"	3455	90° 44' 50"	3455	92° 6' 4"	3455	93° 27' 18"	3454
	VENUS W.	48 38 0	3576	49 57 0	3576	51 16 1	3574	52 35 4	3579
	Antares W.	44 56 10	3199	46 22 29	3180	47 48 55	3181	49 15 27	3176
	Fomalhaut E.	46 58 57	3685	45 44 21	3685	44 30 26	3609	43 17 15	3655
	α Pegasi E.	59 55 15	3409	58 33 9	2490	57 11 15	3431	55 49 34	3444
16	SUN W.	100 13 49	3444	101 35 16	3440	102 56 47	3436	104 18 23	3431
	VENUS W.	59 11 3	3554	60 30 28	3549	61 49 58	3545	63 9 33	3539
	Antares W.	56 29 46	3147	57 56 59	3141	59 24 19	3134	60 51 47	3197
	Fomalhaut E.	37 24 32	4271	36 17 13	4358	35 11 14	4455	34 6 42	4564
	α Pegasi E.	49 4 54	3518	47 44 50	3536	46 25 6	3556	45 5 44	3579
	α Arietis E.	91 16 47	3179	89 50 13	3176	88 23 35	3179	86 56 53	3168
17	SUN W.	111 7 54	3400	112 30 10	3393	113 52 35	3385	115 15 9	3376
	VENUS W.	69 49 13	3503	71 9 34	3495	72 30 4	3487	73 50 43	3477
	Antares W.	68 11 21	3089	69 39 44	3080	71 8 18	3073	72 37 2	3063
	α Pegasi E.	38 35 56	3734	37 19 45	3779	36 4 21	3899	34 49 49	3886
	α Arietis E.	79 41 59	3143	78 14 41	3138	76 47 17	3131	75 19 45	3194
18	SUN W.	122 10 35	3398	123 34 14	3317	124 58 6	3306	126 22 10	3294
	VENUS W.	80 36 43	3495	81 58 31	3414	83 20 31	3403	84 42 45	3391
	Antares W.	80 3 38	3013	81 33 35	3009	83 3 45	2991	84 34 9	2981
	α Arietis E.	68 0 7	3091	66 31 47	3084	65 3 18	3078	63 34 41	3071
	Aldebaran E.	100 23 4	2951	98 51 50	2941	97 20 23	2930	95 48 42	2930
19	SUN W.	133 25 58	3324	134 51 27	3291	136 17 11	3268	137 43 11	3195
	VENUS W.	91 37 25	3396	93 1 6	3313	94 25 2	3300	95 49 14	3286
	Antares W.	92 9 41	2999	93 41 32	2990	95 13 39	2987	96 46 2	2985
	α Aquilæ W.	47 14 51	3712	48 31 25	3690	49 48 55	3611	51 7 17	3565
	α Arietis E.	56 9 33	3039	54 40 8	3034	53 10 37	3029	51 41 0	3094
	Aldebaran E.	88 6 46	2989	86 33 38	2949	85 0 14	2936	83 26 33	2993
20	VENUS W.	102 54 18	3215	104 20 9	3201	105 46 17	3187	107 12 42	3173
	α Aquilæ W.	57 51 0	3399	59 13 52	3335	60 37 23	3304	62 1 30	3273
	α Arietis E.	44 11 54	3017	42 42 2	3019	41 12 13	3094	39 42 30	3030
	Aldebaran E.	75 33 56	2757	73 58 32	2744	72 22 51	2731	70 46 52	2717
21	α Aquilæ W.	69 10 33	3140	70 37 54	3117	72 5 43	3095	73 33 59	3073
	Fomalhaut W.	38 13 26	3734	39 29 48	3637	40 47 42	3559	42 7 1	3486
	α Arietis E.	32 17 17	3117	30 49 28	3151	29 22 20	3193	27 56 3	3246
	Aldebaran E.	62 42 24	2649	61 4 35	2635	59 26 28	2622	57 48 3	2608
	SATURN E.	92 51 18	2659	91 13 43	2646	89 35 50	2639	87 57 38	2618
22	α Aquilæ W.	81 1 32	2980	82 32 10	2965	84 3 7	2950	85 34 23	2936
	Fomalhaut W.	49 1 39	3908	50 27 39	3163	51 54 32	3193	53 22 14	3085
	α Pegasi W.	33 56 54	3410	35 18 59	3398	36 42 38	3255	38 7 42	3190
	Aldebaran E.	49 31 24	2543	47 51 11	2530	46 10 40	2518	44 29 52	2507
	SATURN E.	79 42 8	2553	78 2 9	2541	76 21 53	2528	74 41 19	2517
23	Fomalhaut W.	60 51 28	2928	62 23 11	2903	63 55 26	2880	65 28 11	2857
	α Pegasi W.	45 30 23	2943	47 1 47	2906	48 33 58	2871	50 6 54	2840
	Aldebaran E.	36 1 47	2449	34 19 22	2438	32 36 42	2429	30 53 48	2419



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	SATURN E. Pollux E.	66 14 27 79 57 33	9460 9537	64 32 18 78 17 11	9450 9537	62 49 55 76 36 36	9440 9518	61 7 17 74 55 48	9431 9510
24	Fomalhaut W. α Pegasi W. SATURN E. Pollux E.	73 18 35 58 0 51 52 30 53 66 29 5	9706 9713 9387 9475	74 53 48 59 37 14 50 47 0 64 47 17	9751 9683 9380 9470	76 29 20 61 14 3 49 2 57 63 5 22	9738 9675 9374 9465	78 5 10 62 51 17 47 18 45 61 23 20	9725 9657 9368 9461
25	Fomalhaut W. α Pegasi W. SATURN E. Pollux E. MARS E. Regulus E.	86 7 59 71 2 42 38 35 41 52 52 11 83 1 55 88 22 17	9679 9569 9344 9455 9509 9382	87 45 7 72 41 52 36 50 45 51 9 54 81 20 44 86 36 49	9679 9578 9341 9457 9486 9317	89 22 24 74 21 17 35 5 45 49 27 40 70 39 25 84 51 14	9667 9569 9339 9459 9490 9311	90 59 48 76 0 55 33 20 42 47 45 29 77 57 58 83 5 31	9663 9561 9337 9463 9485 9307
26	α Pegasi W. α Arietis W. SATURN E. Pollux E. MARS E. Regulus E.	84 21 39 40 44 51 24 35 31 39 16 47 69 29 12 74 15 23	9530 9563 9349 9510 9467 9389	86 2 11 42 24 37 22 50 43 37 35 47 67 47 12 72 29 7	9525 9542 9358 9525 9464 9326	87 42 49 44 4 52 21 6 8 35 55 9 66 5 8 70 42 47	9522 9593 9370 9345 9462 9383	89 23 31 45 45 33 19 21 50 34 14 58 64 23 1 68 56 23	9520 9506 9367 9569 9460 9381
27	α Arietis W. MARS E. Regulus E. JUPITER E. SUN E.	54 14 0 55 51 54 60 3 48 88 19 46 126 13 17	9448 9453 9275 9398 9595	55 56 26 54 9 38 58 17 12 86 34 27 124 34 15	9440 9455 9275 9398 9594	57 39 4 52 27 22 56 30 36 84 49 8 122 55 12	9433 9455 9276 9397 9593	59 21 51 50 45 6 54 44 1 83 3 48 121 16 8	9428 9457 9277 9397 9593
28	α Arietis W. Aldebaran W. MARS E. Regulus E. JUPITER E. SUN E.	67 57 32 34 18 28 42 14 16 45 51 20 74 17 14 113 0 50	9410 9272 9465 9282 9330 9596	69 40 55 36 5 9 40 32 14 44 4 54 72 31 58 111 21 49	9407 9273 9469 9283 9331 9597	71 24 20 37 51 48 38 50 17 42 18 30 70 46 44 109 42 50	9405 9274 9472 9285 9333 9599	73 7 47 39 38 25 37 8 25 40 32 9 69 1 32 108 3 53	9405 9276 9476 9288 9334 9601
29	α Arietis W. Aldebaran W. MARS E. Regulus E. JUPITER E. SUN E.	81 45 9 48 30 53 28 40 44 31 41 27 60 16 11 99 49 48	9407 9286 9506 9305 9344 9611	83 28 34 50 17 13 26 59 39 29 55 35 58 31 16 98 11 8	9408 9286 9515 9309 9347 9614	85 11 57 52 3 30 25 18 46 28 9 49 56 46 25 96 32 32	9410 9291 9525 9315 9349 9617	86 55 17 53 49 42 23 38 8 26 24 11 55 1 37 94 54 0	9412 9294 9538 9321 9352 9619
30	Aldebaran W. SATURN W. JUPITER E. SUN E.	62 39 43 32 49 54 46 18 41 86 42 22	9309 9339 9367 9637	64 25 30 34 34 56 44 34 19 85 4 17	9312 9339 9371 9640	66 11 12 36 19 58 42 50 3 83 26 17	9315 9340 9375 9644	67 56 49 38 4 59 41 5 52 81 48 22	9320 9342 9378 9649
31	Aldebaran W. SATURN W. Pollux W. JUPITER E. SUN E.	76 43 31 46 49 29 34 39 11 32 26 16 73 40 12	9339 9359 9599 9398 9670	78 28 34 48 34 13 36 18 7 30 42 38 72 2 52	9342 9359 9583 9402 9675	80 13 32 50 18 52 37 57 25 28 59 6 70 25 38	9346 9359 9569 9407 9680	81 58 24 52 3 26 39 37 2 27 15 41 68 48 31	9351 9362 9558 9411 9684

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
SUN.	1	<sup>h</sup> 14 <sup>m</sup> 27 <sup>s</sup> 22.95	9.813	S. 14° 34' 53.9"	-47.85	16' 9.92"	66.99	<sup>m</sup> 16 <sup>s</sup> 19.10	0.043
Mon.	2	14 31 18.89	9.848	14 53 55.4	47.26	16 10.16	67.11	16 19.71	0.008
Tues.	3	14 35 15.66	9.883	15 12 42.6	46.65	16 10.40	67.22	16 19.50	0.026
Wed.	4	14 39 13.27	9.918	15 31 14.8	-46.02	16 10.64	67.34	16 18.45	0.061
Thur.	5	14 43 11.72	9.953	15 49 31.6	45.37	16 10.88	67.46	16 16.56	0.096
Frid.	6	14 47 11.01	9.988	16 7 32.6	44.71	16 11.11	67.58	16 13.83	0.131
Sat.	7	14 51 11.14	10.023	16 25 17.5	-44.03	16 11.34	67.70	16 10.27	0.166
SUN.	8	14 55 12.11	10.058	16 42 45.9	43.33	16 11.57	67.82	16 5.86	0.201
Mon.	9	14 59 13.93	10.093	16 59 57.2	42.61	16 11.80	67.94	16 0.61	0.236
Tues.	10	15 3 16.59	10.128	17 16 51.1	-41.88	16 12.03	68.06	15 54.52	0.271
Wed.	11	15 7 20.09	10.163	17 33 27.2	41.13	16 12.26	68.18	15 47.60	0.306
Thur.	12	15 11 24.42	10.198	17 49 45.1	40.36	16 12.48	68.30	15 39.84	0.340
Frid.	13	15 15 29.59	10.233	18 5 44.4	-39.57	16 12.70	68.42	15 31.24	0.375
Sat.	14	15 19 35.59	10.268	18 21 24.5	38.76	16 12.92	68.54	15 21.82	0.410
SUN.	15	15 23 42.42	10.302	18 36 45.2	37.94	16 13.14	68.66	15 11.58	0.444
Mon.	16	15 27 50.07	10.336	18 51 46.1	-37.11	16 13.36	68.77	15 0.51	0.478
Tues.	17	15 31 58.54	10.370	19 6 26.8	36.26	16 13.57	68.89	14 48.63	0.512
Wed.	18	15 36 7.82	10.404	19 20 46.9	35.40	16 13.77	69.00	14 35.94	0.546
Thur.	19	15 40 17.91	10.438	19 34 46.0	-34.52	16 13.97	69.12	14 22.44	0.580
Frid.	20	15 44 28.81	10.471	19 48 23.8	33.62	16 14.17	69.23	14 8.13	0.613
Sat.	21	15 48 40.52	10.504	20 1 39.9	32.71	16 14.36	69.34	13 53.02	0.646
SUN.	22	15 52 53.03	10.537	20 14 34.0	-31.78	16 14.55	69.45	13 37.11	0.679
Mon.	23	15 57 6.33	10.570	20 27 5.6	30.84	16 14.73	69.56	13 20.41	0.712
Tues.	24	16 1 20.42	10.602	20 39 14.6	29.89	16 14.91	69.67	13 2.93	0.744
Wed.	25	16 5 35.28	10.635	20 51 0.6	-28.92	16 15.08	69.78	12 44.68	0.776
Thur.	26	16 9 50.89	10.666	21 2 23.2	27.94	16 15.25	69.88	12 25.67	0.807
Frid.	27	16 14 7.24	10.697	21 13 22.0	26.95	16 15.41	69.98	12 5.92	0.838
Sat.	28	16 18 24.33	10.727	21 23 56.9	-25.94	16 15.57	70.07	11 45.45	0.868
SUN.	29	16 22 42.14	10.756	21 34 7.4	24.92	16 15.72	70.16	11 24.26	0.897
Mon.	30	16 27 0.65	10.785	21 43 53.4	23.89	16 15.87	70.25	11 2.37	0.926
Tues.	31	16 31 19.83	10.812	S. 21° 53' 14.4"	-22.85	16 16.01	70.34	10 39.80	0.953

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sideral time.  
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.



AT GREENWICH MEAN NOON.								
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
SUN.	1	14 27 25.62	9.814	S. 14 35 7.0	-47.85	16 19.11	0.043	14 43 44.73
Mon.	2	14 31 21.57	9.849	14 54 8.4	47.26	16 19.71	0.008	14 47 41.28
Tues.	3	14 35 18.35	9.883	15 12 55.3	46.64	16 19.49	0.026	14 51 37.84
Wed.	4	14 39 15.97	9.918	15 31 27.3	-46.01	16 18.43	0.061	14 55 34.40
Thur.	5	14 43 14.42	9.953	15 49 43.9	45.36	16 16.53	0.096	14 59 30.95
Frid.	6	14 47 13.71	9.988	16 7 44.7	44.70	16 13.79	0.131	15 3 27.50
Sat.	7	14 51 13.84	10.023	16 25 29.4	-44.02	16 10.22	0.166	15 7 24.06
SUN.	8	14 55 14.81	10.058	16 42 57.5	43.32	16 5.80	0.201	15 11 20.61
Mon.	9	14 59 16.62	10.093	17 0 8.6	42.60	16 0.55	0.236	15 15 17.17
Tues.	10	15 3 19.27	10.128	17 17 2.2	-41.87	15 54.45	0.271	15 19 13.72
Wed.	11	15 7 22.76	10.163	17 33 38.0	41.12	15 47.52	0.306	15 23 10.28
Thur.	12	15 11 27.08	10.197	17 49 55.6	40.35	15 39.75	0.340	15 27 6.83
Frid.	13	15 15 32.23	10.232	18 5 54.6	-39.56	15 31.15	0.375	15 31 3.38
Sat.	14	15 19 38.22	10.267	18 21 34.4	38.75	15 21.72	0.410	15 34 59.94
SUN.	15	15 23 45.03	10.301	18 36 54.8	37.93	15 11.47	0.444	15 38 56.50
Mon.	16	15 27 52.66	10.335	18 51 55.4	-37.10	15 0.39	0.478	15 42 53.05
Tues.	17	15 32 1.10	10.369	19 6 35.8	36.25	14 48.51	0.512	15 46 49.61
Wed.	18	15 36 10.35	10.403	19 20 55.6	35.39	14 35.81	0.546	15 50 46.16
Thur.	19	15 40 20.41	10.437	19 34 54.3	-34.51	14 22.31	0.580	15 54 42.72
Frid.	20	15 44 31.28	10.470	19 48 31.7	33.61	14 7.99	0.613	15 58 39.27
Sat.	21	15 48 42.96	10.503	20 1 47.4	32.70	13 52.87	0.646	16 2 35.83
SUN.	22	15 52 55.43	10.536	20 14 41.2	-31.77	13 36.95	0.679	16 6 32.38
Mon.	23	15 57 8.68	10.569	20 27 12.5	30.83	13 20.25	0.712	16 10 28.93
Tues.	24	16 1 22.72	10.601	20 39 21.1	29.88	13 2.77	0.744	16 14 25.49
Wed.	25	16 5 37.53	10.633	20 51 6.7	-28.91	12 44.52	0.776	16 18 22.05
Thur.	26	16 9 53.09	10.664	21 2 29.0	27.93	12 25.51	0.807	16 22 18.60
Frid.	27	16 14 9.40	10.695	21 13 27.5	26.94	12 5.76	0.838	16 26 15.16
Sat.	28	16 18 26.43	10.725	21 24 2.0	-25.93	11 45.28	0.868	16 30 11.71
SUN.	29	16 22 44.18	10.754	21 34 12.2	24.91	11 24.09	0.897	16 34 8.27
Mon.	30	16 27 2.63	10.783	21 43 57.8	23.88	11 2.20	0.926	16 38 4.83
Tues.	31	16 31 21.75	10.810	S. 21 53 18.5	-22.84	10 39.63	0.953	16 42 1.38
NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.								Diff. for 1 Hour, + 9'.8565. (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	305	219° 15' 33.7	14' 55.1	150.28	— 0.39	9.9964393	— 45.1	<sup>h</sup> 9 <sup>m</sup> 14 <sup>s</sup> 44.13
2	306	220 15 41.7	15 3.0	150.36	0.27	9.9963316	44.8	9 10 48.23
3	307	221 15 51.8	15 13.0	150.45	0.14	9.9962245	44.5	9 6 52.32
4	308	222 16 3.9	15 25.1	150.54	— 0.01	9.9961181	— 44.2	9 2 56.42
5	309	223 16 18.1	15 39.1	150.62	+ 0.11	9.9960123	43.9	8 59 0.51
6	310	224 16 34.2	15 55.0	150.70	0.21	9.9959072	43.7	8 55 4.60
7	311	225 16 52.0	16 12.7	150.78	+ 0.30	9.9958027	— 43.5	8 51 8.69
8	312	226 17 11.5	16 32.1	150.85	0.35	9.9956968	43.2	8 47 12.78
9	313	227 17 32.7	16 53.2	150.92	0.36	9.9955955	42.9	8 43 16.87
10	314	228 17 55.4	17 15.8	150.98	+ 0.36	9.9954930	— 42.5	8 39 20.96
11	315	229 18 19.6	17 39.9	151.05	0.32	9.9953913	42.1	8 35 25.06
12	316	230 18 45.3	18 5.4	151.11	0.26	9.9952906	41.7	8 31 29.15
13	317	231 19 12.3	18 32.3	151.16	+ 0.16	9.9951910	— 41.2	8 27 33.24
14	318	232 19 40.7	19 0.6	151.21	+ 0.06	9.9950927	40.7	8 23 37.33
15	319	233 20 10.4	19 30.1	151.26	— 0.07	9.9949958	40.1	8 19 41.42
16	320	234 20 41.4	20 0.9	151.31	— 0.21	9.9949005	— 39.4	8 15 45.51
17	321	235 21 13.6	20 33.0	151.36	0.34	9.9948070	38.6	8 11 49.60
18	322	236 21 47.1	21 6.4	151.42	0.47	9.9947153	37.8	8 7 53.69
19	323	237 22 21.8	21 41.0	151.47	— 0.60	9.9946256	— 36.9	8 3 57.78
20	324	238 22 57.8	22 16.8	151.53	0.70	9.9945380	36.0	8 0 1.87
21	325	239 23 35.1	22 53.9	151.59	0.79	9.9944526	35.1	7 56 5.96
22	326	240 24 13.8	23 32.5	151.65	— 0.85	9.9943695	— 34.1	7 52 10.05
23	327	241 24 54.0	24 12.6	151.71	0.86	9.9942887	33.2	7 48 14.14
24	328	242 25 35.6	24 54.1	151.77	0.86	9.9942103	32.2	7 44 18.23
25	329	243 26 18.6	25 36.9	151.83	— 0.81	9.9941342	— 31.3	7 40 22.32
26	330	244 27 3.1	26 21.2	151.89	0.76	9.9940601	30.4	7 36 26.41
27	331	245 27 49.1	27 7.1	151.95	0.66	9.9939861	29.5	7 32 30.50
28	332	246 28 36.6	27 54.5	152.01	— 0.55	9.9939182	— 28.7	7 28 34.59
29	333	247 29 25.6	28 43.4	152.07	0.43	9.9938504	27.9	7 24 38.68
30	334	248 30 16.1	29 33.7	152.13	0.31	9.9937846	27.1	7 20 42.77
31	335	249 31 8.0	30 25.4	152.19	— 0.17	9.9937206	— 26.4	7 16 46.86
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>th</sup> .								
								Diff. for 1 Hour, — 9 <sup>h</sup> . 52 <sup>m</sup> . 26 <sup>s</sup> . (Table II.)

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	16' 3.3	16' 0.9	58' 48.6	- 0.69	58' 39.8	- 0.77	<sup>h</sup> 20 <sup>m</sup> 11.5	<sup>m</sup> 2.12	<sup>d</sup> 24.2
2	15 58.2	15 55.3	58 30.0	0.85	58 19.4	0.92	21 1.8	2.07	25.2
3	15 52.2	15 48.8	58 7.9	1.00	57 55.4	1.07	21 51.3	2.05	26.2
4	15 45.2	15 41.3	57 42.1	- 1.14	57 27.9	- 1.21	22 40.4	2.05	27.2
5	15 37.2	15 33.0	57 12.9	1.27	56 57.4	1.32	23 29.6	2.05	28.2
6	15 28.6	15 24.2	56 41.3	1.35	56 25.0	1.37	6		29.2
7	15 19.7	15 15.3	56 8.5	- 1.37	55 52.2	- 1.35	0 18.9	2.06	0.6
8	15 10.9	15 6.7	55 36.2	1.31	55 20.8	1.24	1 8.5	2.06	1.6
9	15 2.8	14 59.2	55 6.4	1.15	54 53.1	1.05	1 57.9	2.05	2.6
10	14 55.9	14 53.1	54 41.2	- 0.92	54 30.9	- 0.78	2 46.8	2.02	3.6
11	14 50.9	14 49.1	54 22.6	0.82	54 16.2	0.44	3 34.9	1.98	4.6
12	14 48.0	14 47.5	54 12.1	- 0.24	54 10.4	- 0.03	4 22.0	1.93	5.6
13	14 47.8	14 48.7	54 11.2	+ 0.18	54 14.6	+ 0.39	5 7.9	1.89	6.6
14	14 50.3	14 52.7	54 20.6	0.61	54 29.2	0.82	5 52.8	1.86	7.6
15	14 55.7	14 59.5	54 40.4	1.04	54 54.2	1.25	6 37.2	1.85	8.6
16	15 3.9	15 8.9	55 10.3	+ 1.43	55 28.7	+ 1.61	7 21.6	1.86	9.6
17	15 14.4	15 20.4	55 49.1	1.77	56 11.2	1.90	8 6.7	1.90	10.6
18	15 26.8	15 33.5	56 34.6	1.99	56 59.1	2.06	8 53.1	1.97	11.6
19	15 40.3	15 47.1	57 24.0	+ 2.08	57 49.0	+ 2.07	9 41.6	2.08	12.6
20	15 53.7	16 0.1	58 13.5	2.00	58 36.9	1.88	10 32.9	2.20	13.6
21	16 6.0	16 11.4	58 58.7	1.73	59 18.4	1.54	11 27.3	2.34	14.6
22	16 16.1	16 20.0	59 35.6	+ 1.31	59 49.8	+ 1.05	12 24.7	2.45	15.6
23	16 23.0	16 25.0	60 0.8	0.77	60 8.4	+ 0.49	13 24.2	2.51	16.6
24	16 26.2	16 26.4	60 12.6	+ 0.21	60 13.3	- 0.07	14 24.6	2.51	17.6
25	16 25.7	16 24.2	60 10.8	- 0.34	60 5.3	- 0.57	15 24.3	2.45	18.6
26	16 21.9	16 19.1	59 57.1	0.77	59 46.7	0.95	16 21.9	2.35	19.6
27	16 15.7	16 12.0	59 34.3	1.09	59 20.5	1.20	17 16.9	2.23	20.6
28	16 7.9	16 3.6	59 5.5	- 1.28	58 49.7	- 1.34	18 9.3	2.13	21.6
29	15 59.2	15 54.6	58 33.4	1.37	58 16.8	1.38	18 59.7	2.06	22.6
30	15 50.1	15 45.6	58 0.2	1.38	57 43.7	1.37	19 48.5	2.02	23.6
31	15 41.2	15 36.8	57 27.3	- 1.35	57 11.3	- 1.32	20 36.7	2.00	24.6

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 1.					TUESDAY 3.				
0	10 13 23.43	2.9698	N. 8° 52' 38.9"	9.669	0	11 59 22.34	2.1657	N. 0° 32' 45.9"	10.757
1	10 15 39.12	2.9601	8 42 57.3	9.717	1	12 1 32.24	2.1645	0 22 0.5	10.755
2	10 17 54.64	2.9573	8 33 12.9	9.763	2	12 3 42.08	2.1634	0 11 15.3	10.751
3	10 20 10.00	2.9547	8 23 25.7	9.809	3	12 5 51.85	2.1623	N. 0 0 30.4	10.746
4	10 22 25.20	2.9520	8 13 35.8	9.855	4	12 8 1.55	2.1612	S. 0 10 14.2	10.741
5	10 24 40.24	2.9494	8 3 43.4	9.895	5	12 10 11.19	2.1602	0 20 58.5	10.734
6	10 26 55.13	2.9468	7 53 48.4	9.937	6	12 12 20.77	2.1591	0 31 42.3	10.726
7	10 29 9.86	2.9442	7 43 50.9	9.979	7	12 14 30.28	2.1580	0 42 25.6	10.717
8	10 31 24.43	2.9416	7 33 50.9	10.019	8	12 16 39.73	2.1571	0 53 8.4	10.708
9	10 33 38.85	2.9391	7 23 48.6	10.058	9	12 18 49.13	2.1562	1 3 50.6	10.697
10	10 35 53.12	2.9366	7 13 44.0	10.096	10	12 20 58.48	2.1554	1 14 32.1	10.686
11	10 38 7.24	2.9341	7 3 37.1	10.133	11	12 23 7.78	2.1546	1 25 12.9	10.674
12	10 40 21.21	2.9317	6 53 28.0	10.169	12	12 25 17.03	2.1537	1 35 53.0	10.661
13	10 42 35.04	2.9292	6 43 16.8	10.203	13	12 27 26.23	2.1529	1 46 32.2	10.646
14	10 44 48.72	2.9268	6 33 3.6	10.237	14	12 29 35.38	2.1522	1 57 10.5	10.630
15	10 47 2.26	2.9245	6 22 48.4	10.269	15	12 31 44.49	2.1515	2 7 47.8	10.614
16	10 49 15.66	2.9222	6 12 31.3	10.301	16	12 33 53.56	2.1507	2 18 24.1	10.597
17	10 51 26.92	2.9198	6 2 12.3	10.332	17	12 36 2.58	2.1500	2 28 59.4	10.579
18	10 53 42.04	2.9176	5 51 51.5	10.361	18	12 38 11.56	2.1494	2 39 33.6	10.560
19	10 55 55.03	2.9154	5 41 29.0	10.389	19	12 40 20.51	2.1488	2 50 6.6	10.539
20	10 58 7.89	2.9132	5 31 4.8	10.417	20	12 42 29.42	2.1482	3 0 38.3	10.517
21	11 0 20.61	2.9110	5 20 39.0	10.443	21	12 44 38.30	2.1477	3 11 8.7	10.495
22	11 2 33.21	2.9088	5 10 11.7	10.468	22	12 46 47.15	2.1472	3 21 37.7	10.472
23	11 4 45.68	2.9068	N. 4 59 42.9	10.492	23	12 48 55.97	2.1467	S. 3 32 5.4	10.449
MONDAY 2.					WEDNESDAY 4.				
0	11 6 58.02	2.9047	N. 4 49 12.7	10.514	0	12 51 4.76	2.1462	S. 3 42 31.6	10.424
1	11 9 10.24	2.9027	4 38 41.2	10.536	1	12 53 13.52	2.1456	3 52 56.3	10.398
2	11 11 22.34	2.9007	4 28 8.3	10.558	2	12 55 22.26	2.1455	4 3 19.4	10.371
3	11 13 34.33	2.1988	4 17 34.2	10.578	3	12 57 30.98	2.1452	4 19 40.8	10.343
4	11 15 46.20	2.1969	4 6 58.9	10.596	4	12 59 39.68	2.1448	4 24 0.5	10.314
5	11 17 57.96	2.1950	3 56 22.6	10.613	5	13 1 48.36	2.1444	4 34 18.5	10.285
6	11 20 9.60	2.1931	3 45 45.3	10.630	6	13 3 57.01	2.1441	4 44 34.7	10.254
7	11 22 21.13	2.1913	3 35 7.0	10.647	7	13 6 5.65	2.1438	4 54 49.0	10.223
8	11 24 32.55	2.1895	3 24 27.7	10.662	8	13 8 14.27	2.1436	5 5 1.5	10.192
9	11 26 43.87	2.1878	3 13 47.6	10.675	9	13 10 22.88	2.1434	5 15 12.0	10.158
10	11 28 55.09	2.1861	3 3 6.7	10.687	10	13 12 31.48	2.1432	5 25 20.5	10.124
11	11 31 6.20	2.1844	2 52 25.1	10.699	11	13 14 40.07	2.1431	5 35 26.9	10.089
12	11 33 17.21	2.1826	2 41 42.8	10.710	12	13 16 48.65	2.1429	5 45 31.2	10.053
13	11 35 28.13	2.1812	2 30 59.9	10.719	13	13 18 57.22	2.1428	5 55 33.3	10.017
14	11 37 38.95	2.1795	2 20 16.5	10.727	14	13 21 5.79	2.1427	6 5 33.2	9.980
15	11 39 49.67	2.1779	2 9 32.6	10.735	15	13 23 14.35	2.1427	6 15 30.9	9.942
16	11 42 0.30	2.1765	1 58 48.3	10.742	16	13 25 22.91	2.1427	6 25 26.2	9.902
17	11 44 10.85	2.1751	1 48 3.6	10.747	17	13 27 31.47	2.1426	6 35 19.1	9.862
18	11 46 21.31	2.1736	1 37 18.6	10.752	18	13 29 40.02	2.1425	6 45 9.6	9.821
19	11 48 31.68	2.1722	1 26 33.4	10.755	19	13 31 48.57	2.1426	6 54 57.6	9.779
20	11 50 41.97	2.1708	1 15 48.0	10.757	20	13 33 57.13	2.1427	7 4 43.1	9.737
21	11 52 52.18	2.1695	1 5 2.5	10.759	21	13 36 5.69	2.1427	7 14 26.0	9.693
22	11 55 2.31	2.1682	0 54 16.9	10.759	22	13 38 14.25	2.1428	7 24 6.3	9.649
23	11 57 12.36	2.1669	0 43 31.4	10.758	23	13 40 22.82	2.1428	7 33 43.9	9.603
24	11 59 22.34	2.1657	N. 0 32 45.9	10.757	24	13 42 31.30	2.1429	S. 7 43 18.7	9.557

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 5.					SATURDAY 7.				
0	13 42 31.39	2.1439	S. 7 43 18.7	9.557	0	15 25 42.47	2.1576	S. 14 15 3.8	6.519
1	13 44 39.97	2.1431	7 52 50.8	9.511	1	15 27 51.93	2.1578	14 21 32.2	6.434
2	13 46 48.56	2.1439	8 2 20.1	9.464	2	15 30 1.41	2.1581	14 27 55.9	6.356
3	13 48 57.16	2.1433	8 11 46.5	9.416	3	15 32 10.91	2.1584	14 34 14.9	6.277
4	13 51 5.76	2.1435	8 21 10.0	9.367	4	15 34 20.42	2.1586	14 40 29.1	6.197
5	13 53 14.38	2.1437	8 30 30.5	9.316	5	15 36 29.94	2.1588	14 46 38.6	6.118
6	13 55 23.01	2.1439	8 39 47.9	9.265	6	15 38 39.48	2.1591	14 52 43.3	6.038
7	13 57 31.65	2.1449	8 49 2.3	9.214	7	15 40 49.03	2.1593	14 58 43.2	5.957
8	13 59 40.31	2.1444	8 58 13.6	9.162	8	15 42 58.59	2.1593	15 4 38.2	5.876
9	14 1 48.98	2.1446	9 7 21.7	9.108	9	15 45 8.15	2.1594	15 10 28.3	5.794
10	14 3 57.66	2.1448	9 16 26.6	9.054	10	15 47 17.72	2.1596	15 16 13.5	5.713
11	14 6 6.36	2.1459	9 25 28.2	9.000	11	15 49 27.30	2.1597	15 21 53.8	5.631
12	14 8 15.08	2.1455	9 34 26.6	8.945	12	15 51 36.89	2.1599	15 27 29.2	5.548
13	14 10 23.82	2.1458	9 43 21.6	8.889	13	15 53 46.49	2.1600	15 32 59.6	5.465
14	14 12 32.57	2.1460	9 52 13.2	8.833	14	15 55 56.09	2.1600	15 38 25.0	5.383
15	14 14 41.34	2.1463	10 1 1.4	8.774	15	15 58 5.69	2.1600	15 43 45.4	5.306
16	14 16 50.13	2.1466	10 9 46.1	8.716	16	16 0 15.29	2.1601	15 49 0.8	5.214
17	14 18 58.94	2.1469	10 18 27.3	8.657	17	16 2 24.90	2.1603	15 54 11.1	5.139
18	14 21 7.76	2.1473	10 27 5.0	8.598	18	16 4 34.51	2.1603	15 59 16.3	5.045
19	14 23 16.60	2.1476	10 35 39.1	8.537	19	16 6 44.12	2.1603	16 4 16.5	4.961
20	14 25 25.47	2.1480	10 44 9.5	8.476	20	16 8 53.73	2.1601	16 9 11.6	4.875
21	14 27 34.36	2.1483	10 52 36.2	8.414	21	16 11 3.33	2.1600	16 14 1.5	4.789
22	14 29 43.27	2.1487	11 0 59.2	8.352	22	16 13 12.93	2.1599	16 18 46.3	4.703
23	14 31 52.20	2.1490	S. 11 9 18.4	8.288	23	16 15 22.52	2.1598	S. 16.23 25.9	4.618
FRIDAY 6.					SUNDAY 8.				
0	14 34 1.15	2.1493	S. 11 17 33.8	8.224	0	16 17 32.11	2.1597	S. 16 28 0.4	4.532
1	14 36 10.12	2.1497	11 25 45.3	8.159	1	16 19 41.60	2.1596	16 32 29.7	4.445
2	14 38 19.12	2.1501	11 33 52.9	8.095	2	16 21 51.26	2.1594	16 36 53.8	4.358
3	14 40 28.14	2.1505	11 41 56.7	8.030	3	16 24 0.82	2.1593	16 41 12.7	4.271
4	14 42 37.18	2.1508	11 49 56.5	7.963	4	16 26 10.37	2.1590	16 45 26.3	4.184
5	14 44 46.24	2.1512	11 57 52.3	7.896	5	16 28 19.90	2.1587	16 49 34.7	4.097
6	14 46 55.33	2.1517	12 5 44.0	7.828	6	16 30 29.42	2.1585	16 53 37.9	4.009
7	14 49 4.44	2.1520	12 13 31.6	7.759	7	16 32 38.92	2.1588	16 57 35.8	3.921
8	14 51 13.57	2.1523	12 21 15.1	7.691	8	16 34 48.41	2.1580	17 1 28.4	3.833
9	14 53 22.72	2.1527	12 28 54.5	7.622	9	16 36 57.88	2.1577	17 5 15.7	3.744
10	14 55 31.89	2.1530	12 36 29.7	7.552	10	16 39 7.33	2.1573	17 8 57.7	3.656
11	14 57 41.08	2.1534	12 44 0.7	7.481	11	16 41 16.76	2.1569	17 12 34.4	3.567
12	14 59 50.30	2.1538	12 51 27.4	7.409	12	16 43 26.16	2.1565	17 16 5.8	3.478
13	15 1 59.54	2.1542	12 58 49.8	7.338	13	16 45 35.54	2.1561	17 19 31.8	3.389
14	15 4 8.80	2.1545	13 6 7.9	7.266	14	16 47 44.89	2.1557	17 22 52.5	3.301
15	15 6 18.08	2.1548	13 13 21.7	7.193	15	16 49 54.22	2.1552	17 26 7.9	3.212
16	15 8 27.38	2.1552	13 20 31.1	7.119	16	16 52 3.52	2.1547	17 29 17.9	3.123
17	15 10 36.70	2.1555	13 27 36.0	7.044	17	16 54 12.79	2.1542	17 32 22.6	3.034
18	15 12 46.04	2.1558	13 34 36.4	6.969	18	16 56 22.02	2.1536	17 35 22.0	2.945
19	15 14 55.40	2.1562	13 41 32.3	6.895	19	16 58 31.22	2.1531	17 38 16.0	2.855
20	15 17 4.78	2.1565	13 48 23.8	6.820	20	17 0 40.39	2.1525	17 41 4.6	2.765
21	15 19 14.18	2.1567	13 55 10.7	6.744	21	17 2 49.52	2.1518	17 43 47.8	2.675
22	15 21 23.59	2.1570	14 1 53.0	6.667	22	17 4 58.61	2.1512	17 46 25.6	2.585
23	15 23 33.02	2.1573	14 8 30.7	6.590	23	17 7 7.66	2.1505	17 48 58.0	2.496
24	15 25 42.47	2.1576	S. 14 15 3.8	6.512	24	17 9 16.67	2.1498	S. 17 51 25.1	2.406

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 9.					WEDNESDAY 11.				
0	17 9 16.67	2.1486	S. 17° 51' 25.1"	2.406	0	18 51 12.99	2.0897	S. 18° 4' 29.0"	1.808
1	17 11 25.64	2.1491	17 53 46.7	2.316	1	18 53 18.32	2.0879	18 2 38.0	1.801
2	17 13 34.56	2.1493	17 56 3.0	2.227	2	18 55 23.54	2.0869	18 0 42.1	1.793
3	17 15 43.44	2.1476	17 58 13.9	2.137	3	18 57 28.66	2.0845	17 58 41.3	2.065
4	17 17 52.27	2.1468	18 0 19.4	2.047	4	18 59 33.68	2.0837	17 56 35.5	2.137
5	17 20 1.05	2.1460	18 2 19.5	1.957	5	19 1 38.59	2.0810	17 54 24.8	2.220
6	17 22 9.79	2.1452	18 4 14.2	1.867	6	19 3 43.40	2.0792	17 52 9.1	2.302
7	17 24 18.47	2.1443	18 6 3.5	1.777	7	19 5 48.10	2.0775	17 49 48.5	2.383
8	17 26 27.10	2.1434	18 7 47.4	1.687	8	19 7 52.70	2.0758	17 47 23.1	2.463
9	17 28 35.68	2.1425	18 9 25.9	1.597	9	19 9 57.20	2.0741	17 44 52.9	2.544
10	17 30 44.20	2.1415	18 10 59.0	1.507	10	19 12 1.59	2.0723	17 42 17.8	2.625
11	17 32 52.66	2.1405	18 12 26.8	1.418	11	19 14 5.87	2.0705	17 39 37.9	2.705
12	17 35 1.06	2.1395	18 13 49.2	1.328	12	19 16 10.05	2.0687	17 36 53.2	2.785
13	17 37 9.40	2.1385	18 15 6.2	1.238	13	19 18 14.12	2.0669	17 34 3.7	2.864
14	17 39 17.68	2.1375	18 16 17.8	1.148	14	19 20 18.08	2.0651	17 31 9.5	2.943
15	17 41 25.90	2.1364	18 17 24.0	1.059	15	19 22 21.93	2.0633	17 28 10.6	3.022
16	17 43 34.05	2.1353	18 18 24.9	0.970	16	19 24 25.67	2.0615	17 25 6.9	3.101
17	17 45 42.13	2.1342	18 19 20.4	0.880	17	19 26 29.31	2.0597	17 21 58.5	3.178
18	17 47 50.15	2.1331	18 20 10.5	0.791	18	19 28 32.84	2.0579	17 18 45.5	3.256
19	17 49 58.10	2.1319	18 20 55.3	0.702	19	19 30 36.26	2.0561	17 15 27.8	3.333
20	17 52 5.98	2.1307	18 21 34.7	0.613	20	19 32 39.57	2.0543	17 12 5.5	3.411
21	17 54 13.79	2.1295	18 22 8.8	0.524	21	19 34 42.77	2.0524	17 8 38.5	3.488
22	17 56 21.52	2.1283	18 22 37.6	0.436	22	19 36 45.86	2.0507	17 5 6.9	3.564
23	17 58 29.18	2.1270	S. 18° 23' 1.1"	0.347	23	19 38 48.85	2.0489	S. 17° 1' 30.8"	3.640
TUESDAY 10.					THURSDAY 12.				
0	18 0 36.76	2.1257	S. 18° 23' 19.2"	0.258	0	19 40 51.73	2.0471	S. 16° 57' 50.1"	3.716
1	18 2 44.26	2.1244	18 23 32.0	0.170	1	19 42 54.50	2.0452	16 54 4.9	3.791
2	18 4 51.69	2.1230	18 23 39.6	- 0.082	2	19 44 57.16	2.0434	16 50 15.2	3.866
3	18 6 59.04	2.1216	18 23 41.9	+ 0.006	3	19 46 59.71	2.0417	16 46 21.0	3.941
4	18 9 6.31	2.1205	18 23 38.9	0.094	4	19 49 2.16	2.0399	16 42 22.3	4.015
5	18 11 13.50	2.1191	18 23 30.6	0.182	5	19 51 4.50	2.0381	16 38 19.2	4.089
6	18 13 20.60	2.1177	18 23 17.1	0.269	6	19 53 6.73	2.0363	16 34 11.6	4.163
7	18 15 27.62	2.1162	18 22 58.3	0.357	7	19 55 8.86	2.0346	16 29 59.6	4.236
8	18 17 34.55	2.1147	18 22 34.3	0.444	8	19 57 10.88	2.0328	16 25 43.3	4.309
9	18 19 41.39	2.1133	18 22 5.1	0.531	9	19 59 12.79	2.0310	16 21 22.6	4.382
10	18 21 48.15	2.1119	18 21 30.6	0.617	10	20 1 14.60	2.0292	16 16 57.5	4.453
11	18 23 54.82	2.1104	18 20 51.0	0.703	11	20 3 16.30	2.0274	16 12 28.2	4.524
12	18 26 1.40	2.1089	18 20 6.2	0.790	12	20 5 17.89	2.0257	16 7 54.6	4.596
13	18 28 7.89	2.1074	18 19 16.2	0.876	13	20 7 19.38	2.0240	16 3 16.7	4.667
14	18 30 14.29	2.1058	18 18 21.1	0.962	14	20 9 20.77	2.0223	15 58 34.6	4.737
15	18 32 20.59	2.1042	18 17 20.8	1.047	15	20 11 22.06	2.0206	15 53 48.2	4.806
16	18 34 26.80	2.1027	18 16 15.4	1.132	16	20 13 23.24	2.0189	15 48 57.6	4.878
17	18 36 32.91	2.1011	18 15 4.9	1.218	17	20 15 24.32	2.0172	15 44 2.8	4.947
18	18 38 38.93	2.0995	18 13 49.2	1.303	18	20 17 25.30	2.0155	15 39 3.9	5.016
19	18 40 44.85	2.0978	18 12 28.5	1.388	19	20 19 26.18	2.0138	15 34 0.9	5.085
20	18 42 50.67	2.0960	18 11 2.7	1.473	20	20 21 26.96	2.0122	15 28 53.7	5.154
21	18 44 56.40	2.0946	18 9 31.8	1.557	21	20 23 27.64	2.0105	15 23 42.4	5.222
22	18 47 2.03	2.0930	18 7 55.9	1.640	22	20 25 28.22	2.0088	15 18 27.1	5.290
23	18 49 7.56	2.0913	18 6 15.0	1.724	23	20 27 28.70	2.0073	15 13 7.8	5.355
24	18 51 12.99	2.0897	S. 18° 4' 29.0"	1.808	24	20 29 29.09	2.0057	S. 15° 7' 44.5"	5.423

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 13.					SUNDAY 15.				
0	20 29 29.09	2.0057	S. 15° 7' 44.5"	5.489	0	22 4 19.39	1.9563	S. 9° 38' 11.5"	8.150
1	20 31 29.38	2.0041	15 2 17.2	5.486	1	22 6 16.76	1.9561	9 30 1.1	8.197
2	20 33 29.58	2.0026	14 56 45.9	5.555	2	22 8 14.12	1.9558	9 21 47.9	8.243
3	20 35 29.69	2.0010	14 51 10.6	5.621	3	22 10 11.46	1.9556	9 13 31.9	8.289
4	20 37 29.70	1.9994	14 45 31.4	5.686	4	22 12 8.79	1.9555	9 5 13.2	8.334
5	20 39 29.62	1.9979	14 39 48.3	5.750	5	22 14 6.12	1.9554	8 56 51.8	8.378
6	20 41 29.45	1.9964	14 34 1.4	5.814	6	22 16 3.44	1.9553	8 48 27.8	8.423
7	20 43 29.19	1.9949	14 28 10.6	5.878	7	22 18 0.76	1.9552	8 40 1.1	8.467
8	20 45 28.84	1.9935	14 22 16.0	5.942	8	22 19 58.07	1.9550	8 31 31.8	8.510
9	20 47 28.41	1.9921	14 16 17.5	6.006	9	22 21 55.38	1.9550	8 22 59.9	8.556
10	20 49 27.89	1.9907	14 10 15.3	6.069	10	22 23 52.70	1.9553	8 14 25.5	8.596
11	20 51 27.29	1.9892	14 4 9.3	6.131	11	22 25 50.02	1.9554	8 5 48.5	8.637
12	20 53 26.60	1.9878	13 57 59.6	6.193	12	22 27 47.35	1.9556	7 57 9.0	8.679
13	20 55 25.83	1.9865	13 51 46.2	6.254	13	22 29 44.69	1.9558	7 48 27.0	8.720
14	20 57 24.98	1.9852	13 45 29.1	6.315	14	22 31 42.04	1.9560	7 39 42.6	8.760
15	20 59 24.05	1.9838	13 39 8.4	6.376	15	22 33 39.41	1.9563	7 30 55.8	8.800
16	21 1 23.04	1.9826	13 32 44.0	6.437	16	22 35 36.79	1.9566	7 22 6.6	8.840
17	21 3 21.96	1.9814	13 26 16.0	6.497	17	22 37 34.20	1.9570	7 13 15.0	8.879
18	21 5 20.81	1.9802	13 19 44.4	6.556	18	22 39 31.63	1.9574	7 4 21.1	8.917
19	21 7 19.58	1.9789	13 13 9.3	6.615	19	22 41 29.09	1.9579	6 55 24.9	8.956
20	21 9 18.28	1.9777	13 6 30.6	6.674	20	22 43 26.58	1.9583	6 46 26.4	8.994
21	21 11 16.90	1.9765	12 59 48.4	6.733	21	22 45 24.09	1.9588	6 37 25.6	9.031
22	21 13 15.46	1.9754	12 53 2.7	6.791	22	22 47 21.64	1.9594	6 28 22.6	9.067
23	21 15 13.95	1.9743	S. 12° 46' 13.5"	6.848	23	22 49 19.22	1.9600	S. 6° 19' 17.5"	9.103
SATURDAY 14.					MONDAY 16.				
0	21 17 12.37	1.9730	S. 12° 39' 20.9"	6.905	0	22 51 16.84	1.9607	S. 6° 10' 10.2"	9.140
1	21 19 10.73	1.9722	12 32 24.9	6.969	1	22 53 14.50	1.9613	6 1 0.7	9.175
2	21 21 9.03	1.9711	12 25 25.5	7.018	2	22 55 12.20	1.9621	5 51 49.2	9.209
3	21 23 7.26	1.9701	12 18 22.7	7.074	3	22 57 9.95	1.9629	5 42 35.6	9.243
4	21 25 5.44	1.9692	12 11 16.6	7.129	4	22 59 7.75	1.9637	5 33 20.0	9.277
5	21 27 3.56	1.9682	12 4 7.2	7.185	5	23 1 5.60	1.9646	5 24 2.4	9.310
6	21 29 1.62	1.9673	11 56 54.4	7.240	6	23 3 3.50	1.9655	5 14 42.8	9.343
7	21 30 59.63	1.9664	11 49 38.4	7.294	7	23 5 1.46	1.9665	5 5 21.2	9.376
8	21 32 57.59	1.9655	11 42 19.2	7.347	8	23 6 59.48	1.9675	4 55 57.7	9.407
9	21 34 55.49	1.9647	11 34 56.8	7.400	9	23 8 57.56	1.9686	4 46 32.4	9.437
10	21 36 53.35	1.9639	11 27 31.2	7.453	10	23 10 55.71	1.9697	4 37 5.3	9.467
11	21 38 51.16	1.9632	11 20 2.4	7.506	11	23 12 53.93	1.9708	4 27 36.4	9.497
12	21 40 48.93	1.9624	11 12 30.4	7.559	12	23 14 52.21	1.9720	4 18 5.7	9.527
13	21 42 46.65	1.9617	11 4 55.3	7.611	13	23 16 50.57	1.9732	4 8 33.2	9.556
14	21 44 44.33	1.9611	10 57 17.1	7.663	14	23 18 49.00	1.9745	3 58 59.0	9.584
15	21 46 41.98	1.9605	10 49 35.9	7.719	15	23 20 47.51	1.9759	3 49 23.2	9.611
16	21 48 39.59	1.9599	10 41 51.7	7.769	16	23 22 46.11	1.9773	3 39 45.7	9.639
17	21 50 37.17	1.9593	10 34 4.5	7.819	17	23 24 44.79	1.9787	3 30 6.6	9.666
18	21 52 34.71	1.9587	10 26 14.3	7.869	18	23 26 43.55	1.9801	3 20 25.8	9.692
19	21 54 32.22	1.9582	10 18 21.1	7.911	19	23 28 42.40	1.9816	3 10 43.5	9.717
20	21 56 29.70	1.9578	10 10 25.0	7.960	20	23 30 41.35	1.9832	3 0 59.8	9.741
21	21 58 27.16	1.9574	10 2 25.9	8.009	21	23 32 40.39	1.9848	2 51 14.6	9.765
22	22 0 24.59	1.9570	9 54 23.9	8.057	22	23 34 39.53	1.9865	2 41 28.0	9.789
23	22 2 22.00	1.9567	9 46 19.1	8.103	23	23 36 38.77	1.9882	2 31 39.9	9.812
24	22 4 19.39	1.9563	S. 9° 38' 11.5"	8.150	24	23 38 38.12	1.9900	S. 2° 21' 50.5"	9.834

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 17.					THURSDAY 19.				
0	23 38 38.12	1.9900	S. 2° 21' 50.5"	9.834	0	1 17 4.91	2.1299	N. 5° 42' 38.5"	10.048
1	23 40 37.57	1.9918	2 11 59.8	9.856	1	1 19 12.82	2.1338	5 52 40.9	10.039
2	23 42 37.13	1.9937	2 2 7.8	9.877	2	1 21 20.97	2.1378	6 2 42.3	10.014
3	23 44 36.81	1.9956	1 52 14.5	9.898	3	1 23 29.36	2.1419	6 12 42.6	9.985
4	23 46 36.60	1.9975	1 42 20.0	9.917	4	1 25 38.00	2.1461	6 22 41.7	9.976
5	23 48 36.51	1.9995	1 32 24.4	9.936	5	1 27 46.89	2.1509	6 32 39.7	9.956
6	23 50 36.54	2.0015	1 22 27.7	9.954	6	1 29 56.02	2.1544	6 42 36.4	9.933
7	23 52 36.69	2.0036	1 12 29.9	9.972	7	1 32 5.41	2.1587	6 52 31.7	9.910
8	23 54 36.97	2.0057	1 2 31.0	9.990	8	1 34 15.06	2.1639	7 2 25.6	9.887
9	23 56 37.38	2.0079	0 52 31.1	10.007	9	1 36 24.96	2.1679	7 12 18.1	9.863
10	23 58 37.92	2.0102	0 42 30.2	10.022	10	1 38 35.12	2.1716	7 22 9.1	9.837
11	0 0 38.60	2.0125	0 32 28.4	10.037	11	1 40 45.55	2.1750	7 31 58.5	9.809
12	0 2 39.42	2.0148	0 22 25.7	10.052	12	1 42 56.24	2.1804	7 41 46.2	9.781
13	0 4 40.38	2.0172	0 12 22.1	10.066	13	1 45 7.20	2.1848	7 51 32.2	9.752
14	0 6 41.48	2.0196	S. 0 2 17.8	10.079	14	1 47 18.42	2.1899	8 1 16.5	9.722
15	0 8 42.73	2.0221	N. 0 7 47.3	10.091	15	1 49 29.91	2.1937	8 10 58.9	9.691
16	0 10 44.13	2.0246	0 17 53.1	10.103	16	1 51 41.67	2.1982	8 20 39.4	9.658
17	0 12 45.68	2.0272	0 27 59.6	10.114	17	1 53 53.70	2.2028	8 30 17.9	9.624
18	0 14 47.39	2.0298	0 38 6.8	10.124	18	1 56 6.01	2.2075	8 39 54.3	9.589
19	0 16 49.25	2.0324	0 48 14.5	10.133	19	1 58 18.60	2.2121	8 49 28.6	9.554
20	0 18 51.28	2.0352	0 58 22.8	10.142	20	2 0 31.46	2.2167	8 59 0.8	9.517
21	0 20 53.47	2.0379	1 8 31.6	10.150	21	2 2 44.60	2.2213	9 8 30.7	9.479
22	0 22 55.83	2.0407	1 18 40.8	10.157	22	2 4 58.02	2.2261	9 17 58.3	9.440
23	0 24 58.36	2.0436	N. 1 28 50.4	10.163	23	2 7 11.73	2.2308	N. 9 27 23.5	9.399
WEDNESDAY 18.					FRIDAY 20.				
0	0 27 1.06	2.0465	N. 1 39 0.4	10.169	0	2 9 25.72	2.2356	N. 9 36 46.2	9.357
1	0 29 3.94	2.0495	1 49 10.7	10.174	1	2 11 40.00	2.2403	9 46 6.4	9.315
2	0 31 7.00	2.0525	1 59 21.3	10.178	2	2 13 54.56	2.2451	9 55 24.0	9.271
3	0 33 10.24	2.0555	2 9 32.1	10.182	3	2 16 9.41	2.2499	10 4 38.9	9.225
4	0 35 13.66	2.0585	2 19 43.1	10.184	4	2 18 24.55	2.2547	10 13 51.0	9.179
5	0 37 17.26	2.0616	2 29 54.2	10.185	5	2 20 39.98	2.2595	10 23 0.4	9.132
6	0 39 21.05	2.0648	2 40 5.3	10.186	6	2 22 55.69	2.2643	10 32 6.9	9.083
7	0 41 25.04	2.0681	2 50 16.5	10.186	7	2 25 11.70	2.2692	10 41 10.4	9.033
8	0 43 29.23	2.0714	3 0 27.6	10.185	8	2 27 28.00	2.2742	10 50 10.9	8.982
9	0 45 33.61	2.0747	3 10 38.7	10.183	9	2 29 44.60	2.2791	10 59 8.3	8.930
10	0 47 38.19	2.0781	3 20 49.6	10.180	10	2 32 1.49	2.2839	11 8 2.5	8.877
11	0 49 42.98	2.0815	3 31 0.3	10.177	11	2 34 18.67	2.2888	11 16 53.5	8.822
12	0 51 47.97	2.0849	3 41 10.8	10.173	12	2 36 36.15	2.2937	11 25 41.1	8.765
13	0 53 53.17	2.0884	3 51 21.0	10.168	13	2 38 53.92	2.2987	11 34 25.3	8.708
14	0 55 58.58	2.0920	4 1 30.9	10.162	14	2 41 11.99	2.3037	11 43 6.1	8.650
15	0 58 4.21	2.0956	4 11 40.4	10.154	15	2 43 30.36	2.3087	11 51 43.3	8.590
16	1 0 10.05	2.0992	4 21 49.4	10.146	16	2 45 49.03	2.3136	12 0 16.9	8.529
17	1 2 16.11	2.1029	4 31 57.9	10.137	17	2 48 7.99	2.3185	12 8 46.8	8.467
18	1 4 22.40	2.1067	4 42 5.8	10.127	18	2 50 27.25	2.3235	12 17 13.0	8.404
19	1 6 28.91	2.1104	4 52 13.1	10.117	19	2 52 46.81	2.3285	12 25 35.3	8.339
20	1 8 35.65	2.1142	5 2 19.8	10.105	20	2 55 6.67	2.3334	12 33 53.7	8.273
21	1 10 42.61	2.1180	5 12 25.7	10.092	21	2 57 26.82	2.3383	12 42 8.1	8.206
22	1 12 49.81	2.1219	5 22 30.8	10.078	22	2 59 47.27	2.3433	12 50 18.4	8.137
23	1 14 57.24	2.1258	5 32 35.1	10.064	23	3 2 8.01	2.3483	12 58 24.5	8.067
24	1 17 4.91	2.1298	N. 5 42 38.5	10.048	24	3 4 29.05	2.3531	N. 13 6 26.5	7.997



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 21.					MONDAY 23.				
0	3 4 29.05	2.3531	N.13° 6' 26.5"	7.997	0	5 2 34.11	2.5479	N.17° 46' 7.1"	3.947
1	3 6 50.38	2.3580	13 14 24.2	7.935	1	5 5 7.06	2.5503	17 49 18.3	3.185
2	3 9 12.01	2.3630	13 22 17.5	7.851	2	5 7 40.15	2.5527	17 52 22.1	3.093
3	3 11 33.94	2.3679	13 30 6.3	7.776	3	5 10 13.39	2.5551	17 55 18.6	2.879
4	3 13 56.16	2.3727	13 37 50.6	7.700	4	5 12 46.77	2.5573	17 58 7.6	2.755
5	3 16 18.67	2.3776	13 45 30.3	7.623	5	5 15 20.27	2.5594	18 0 49.2	2.631
6	3 18 41.47	2.3825	13 53 5.4	7.545	6	5 17 53.90	2.5615	18 3 23.3	2.506
7	3 21 4.57	2.3873	14 0 35.7	7.465	7	5 20 27.65	2.5635	18 5 49.9	2.380
8	3 23 27.95	2.3921	14 8 1.2	7.385	8	5 23 1.52	2.5654	18 8 8.9	2.253
9	3 25 51.62	2.3969	14 15 21.9	7.303	9	5 25 35.50	2.5678	18 10 20.3	2.127
10	3 28 15.58	2.4017	14 22 37.6	7.219	10	5 28 9.58	2.5698	18 12 24.1	2.000
11	3 30 39.82	2.4064	14 29 48.2	7.135	11	5 30 43.75	2.5703	18 14 20.3	1.876
12	3 33 4.35	2.4111	14 36 53.8	7.050	12	5 33 18.01	2.5718	18 16 8.8	1.744
13	3 35 29.16	2.4158	14 43 54.2	6.963	13	5 35 52.36	2.5738	18 17 49.6	1.616
14	3 37 54.25	2.4205	14 50 49.3	6.874	14	5 38 26.79	2.5745	18 19 22.7	1.487
15	3 40 19.62	2.4251	14 57 39.1	6.785	15	5 41 1.30	2.5757	18 20 48.1	1.359
16	3 42 45.26	2.4297	15 4 23.5	6.695	16	5 43 35.88	2.5767	18 22 5.8	1.230
17	3 45 11.18	2.4343	15 11 2.5	6.603	17	5 46 10.51	2.5777	18 23 15.7	1.100
18	3 47 37.37	2.4387	15 17 35.9	6.510	18	5 48 45.20	2.5786	18 24 17.8	0.970
19	3 50 3.83	2.4432	15 24 3.7	6.417	19	5 51 19.94	2.5793	18 25 12.1	0.840
20	3 52 30.55	2.4476	15 30 25.9	6.323	20	5 53 54.72	2.5800	18 25 58.6	0.711
21	3 54 57.54	2.4520	15 36 42.3	6.225	21	5 56 29.54	2.5806	18 26 37.4	0.581
22	3 57 24.79	2.4563	15 42 52.9	6.128	22	5 59 4.39	2.5811	18 27 8.3	0.450
23	3 59 52.30	2.4607	N.15 48 57.7	6.030	23	6 1 39.27	2.5815	N.18 27 31.4	0.319
SUNDAY 22.					TUESDAY 24.				
0	4 2 20.07	2.4649	N.15 54 56.5	5.930	0	6 4 14.17	2.5817	N.18 27 46.6	0.188
1	4 4 48.09	2.4691	16 0 49.3	5.839	1	6 6 49.08	2.5819	18 27 54.0	+ 0.057
2	4 7 16.36	2.4733	16 6 36.0	5.737	2	6 9 24.00	2.5819	18 27 53.5	- 0.073
3	4 9 44.88	2.4773	16 12 16.6	5.625	3	6 11 58.91	2.5818	18 27 45.2	0.203
4	4 12 13.64	2.4813	16 17 51.0	5.501	4	6 14 33.82	2.5817	18 27 29.1	0.334
5	4 14 42.64	2.4853	16 23 19.1	5.416	5	6 17 8.72	2.5816	18 27 5.1	0.465
6	4 17 11.88	2.4892	16 28 40.9	5.310	6	6 19 43.61	2.5813	18 26 33.3	0.595
7	4 19 41.35	2.4931	16 33 56.3	5.203	7	6 22 18.47	2.5806	18 25 53.7	0.725
8	4 22 11.05	2.4969	16 39 5.3	5.096	8	6 24 53.30	2.5803	18 25 6.3	0.856
9	4 24 40.98	2.5007	16 44 7.8	4.987	9	6 27 28.10	2.5797	18 24 11.0	0.987
10	4 27 11.13	2.5043	16 49 3.7	4.877	10	6 30 2.86	2.5789	18 23 7.9	1.116
11	4 29 41.50	2.5079	16 53 53.0	4.766	11	6 32 37.57	2.5781	18 21 57.1	1.245
12	4 32 12.08	2.5114	16 58 35.6	4.654	12	6 35 12.23	2.5779	18 20 38.5	1.374
13	4 34 42.87	2.5149	17 3 11.4	4.541	13	6 37 46.83	2.5769	18 19 12.2	1.503
14	4 37 13.87	2.5183	17 7 40.5	4.428	14	6 40 21.37	2.5750	18 17 38.1	1.633
15	4 39 45.07	2.5216	17 12 2.8	4.314	15	6 42 55.83	2.5738	18 15 56.2	1.762
16	4 42 16.46	2.5248	17 16 18.2	4.198	16	6 45 30.22	2.5725	18 14 6.6	1.890
17	4 44 48.04	2.5279	17 20 26.6	4.089	17	6 48 4.53	2.5711	18 12 9.4	2.017
18	4 47 19.81	2.5310	17 24 28.0	3.985	18	6 50 38.75	2.5696	18 10 4.5	2.145
19	4 49 51.76	2.5340	17 28 22.4	3.877	19	6 53 12.88	2.5680	18 7 52.0	2.272
20	4 52 23.89	2.5370	17 32 9.7	3.769	20	6 55 46.91	2.5663	18 5 31.9	2.399
21	4 54 56.20	2.5398	17 35 49.9	3.610	21	6 58 20.84	2.5646	18 3 4.1	2.526
22	4 57 28.67	2.5426	17 39 22.9	3.499	22	7 0 54.66	2.5627	18 0 28.8	2.651
23	5 0 1.31	2.5453	17 42 48.6	3.368	23	7 3 28.37	2.5608	17 57 46.0	2.776
24	5 2 34.11	2.5479	N.17 46 7.1	3.247	24	7 6 1.96	2.5588	N.17 54 55.7	2.901

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 25.					FRIDAY 27.				
0	7 6 1.96	2.5588	N.17° 54' 55.7"	2.901	0	9 5 16.41	2.3993	N.13° 26' 51.1"	7.909
1	7 8 35.43	2.5567	17 51 57.9	3.095	1	9 7 39.82	2.3981	13 18 54.6	7.981
2	7 11 8.76	2.5544	17 48 52.7	3.148	2	9 10 2.98	2.3938	13 10 53.4	8.058
3	7 13 41.96	2.5521	17 45 40.1	3.271	3	9 12 25.88	2.3796	13 2 47.6	8.135
4	7 16 15.02	2.5498	17 42 20.1	3.303	4	9 14 48.53	2.3754	12 54 37.2	8.210
5	7 18 47.94	2.5475	17 38 52.9	3.514	5	9 17 10.93	2.3712	12 46 22.4	8.284
6	7 21 20.72	2.5450	17 35 18.4	3.636	6	9 19 33.07	2.3680	12 38 3.2	8.357
7	7 23 53.34	2.5423	17 31 36.6	3.756	7	9 21 54.96	2.3627	12 29 39.6	8.428
8	7 26 25.80	2.5397	17 27 47.7	3.875	8	9 24 16.60	2.3586	12 21 11.8	8.498
9	7 28 58.10	2.5370	17 23 51.6	3.994	9	9 26 37.99	2.3543	12 12 39.8	8.568
10	7 31 30.24	2.5349	17 19 48.4	4.119	10	9 28 59.12	2.3501	12 4 3.6	8.637
11	7 34 2.21	2.5314	17 15 38.1	4.230	11	9 31 20.00	2.3459	11 55 23.3	8.705
12	7 36 34.01	2.5285	17 11 20.8	4.347	12	9 33 40.63	2.3417	11 46 39.0	8.771
13	7 39 5.63	2.5254	17 6 56.5	4.463	13	9 36 1.01	2.3376	11 37 50.8	8.835
14	7 41 37.06	2.5223	17 2 25.3	4.578	14	9 38 21.14	2.3335	11 28 58.8	8.898
15	7 44 8.31	2.5192	16 57 47.2	4.693	15	9 40 41.03	2.3294	11 20 3.0	8.961
16	7 46 39.37	2.5160	16 53 2.3	4.804	16	9 43 0.67	2.3252	11 11 3.5	9.022
17	7 49 10.23	2.5128	16 48 10.7	4.916	17	9 45 20.06	2.3211	11 2 0.3	9.082
18	7 51 40.90	2.5095	16 43 12.4	5.028	18	9 47 39.20	2.3170	10 52 53.6	9.141
19	7 54 11.37	2.5061	16 38 7.4	5.139	19	9 49 58.10	2.3130	10 43 43.4	9.199
20	7 56 41.63	2.5027	16 32 55.7	5.249	20	9 52 16.76	2.3089	10 34 29.7	9.256
21	7 59 11.69	2.4992	16 27 37.5	5.357	21	9 54 35.18	2.3050	10 25 12.7	9.311
22	8 1 41.54	2.4957	16 22 12.8	5.465	22	9 56 53.36	2.3010	10 15 52.4	9.366
23	8 4 11.17	2.4921	N.16 16 41.7	5.573	23	9 59 11.30	2.2971	N.10 6 28.8	9.419
THURSDAY 26.					SATURDAY 28.				
0	8 6 40.59	2.4885	N.16 11 4.2	5.678	0	10 1 29.01	2.2932	N. 9 57 2.1	9.471
1	8 9 9.79	2.4848	16 5 20.4	5.783	1	10 3 46.48	2.2892	9 47 32.3	9.522
2	8 11 38.77	2.4812	15 59 30.3	5.887	2	10 6 3.72	2.2853	9 37 59.5	9.571
3	8 14 7.53	2.4774	15 53 34.0	5.989	3	10 8 20.72	2.2814	9 28 23.8	9.619
4	8 16 36.06	2.4738	15 47 31.6	6.091	4	10 10 37.49	2.2776	9 18 45.2	9.667
5	8 19 4.36	2.4697	15 41 23.1	6.193	5	10 12 54.03	2.2738	9 9 3.7	9.714
6	8 21 32.43	2.4659	15 35 8.5	6.292	6	10 15 10.35	2.2701	8 59 19.5	9.759
7	8 24 0.27	2.4620	15 28 48.0	6.391	7	10 17 26.44	2.2663	8 49 32.6	9.803
8	8 26 27.87	2.4581	15 22 21.6	6.488	8	10 19 42.31	2.2626	8 39 43.1	9.846
9	8 28 55.24	2.4542	15 15 49.4	6.585	9	10 21 57.95	2.2589	8 29 51.1	9.887
10	8 31 22.37	2.4502	15 9 11.4	6.681	10	10 24 13.38	2.2553	8 19 56.6	9.928
11	8 33 49.26	2.4462	15 2 27.7	6.775	11	10 26 28.59	2.2517	8 9 59.7	9.968
12	8 36 15.91	2.4421	14 55 36.4	6.868	12	10 28 43.58	2.2481	8 0 0.4	10.007
13	8 38 42.31	2.4380	14 48 43.5	6.961	13	10 30 58.36	2.2446	7 49 58.9	10.044
14	8 41 8.47	2.4340	14 41 43.1	7.052	14	10 33 12.93	2.2410	7 39 55.2	10.080
15	8 43 34.39	2.4299	14 34 37.3	7.142	15	10 35 27.28	2.2375	7 29 49.3	10.116
16	8 46 0.06	2.4257	14 27 26.1	7.231	16	10 37 41.43	2.2341	7 19 41.3	10.150
17	8 48 25.48	2.4216	14 20 9.6	7.319	17	10 39 55.38	2.2306	7 9 31.3	10.182
18	8 50 50.65	2.4174	14 12 47.8	7.406	18	10 42 9.13	2.2275	6 59 19.4	10.214
19	8 53 15.57	2.4132	14 5 20.9	7.491	19	10 44 22.68	2.2242	6 49 5.6	10.245
20	8 55 40.24	2.4091	13 57 48.9	7.576	20	10 46 36.03	2.2209	6 38 50.0	10.275
21	8 58 4.66	2.4049	13 50 11.8	7.659	21	10 48 49.18	2.2176	6 28 32.6	10.304
22	9 0 28.83	2.4007	13 42 29.8	7.741	22	10 51 2.14	2.2144	6 18 13.5	10.332
23	9 2 52.75	2.3965	13 34 42.9	7.822	23	10 53 14.91	2.2113	6 7 52.8	10.358
24	9 5 16.41	2.3923	N.13 26 51.1	7.902	24	10 55 27.49	2.2082	N. 5 57 30.5	10.384

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 29.					TUESDAY, DECEMBER 1.				
0	10 <sup>h</sup> 55 <sup>m</sup> 27.49	2.9082	N. 5° 57' 30.5	10.384	0	12 <sup>h</sup> 38 <sup>m</sup> 42.96	2.1116	S. 2° 31' 27.4	10.463
1	10 57 39.89	2.9052	5 47 6.7	10.408	<p>PHASES OF THE MOON.</p> <p>           ● New Moon    November    6    9    2.7            ☾ First Quarter    . . . . 14    9    59.6            ○ Full Moon    . . . . 21    21    39.3            ☾ Last Quarter . . . . 28    13    57.1         </p>				
2	10 59 52.11	2.9021	5 36 41.5	10.432					
3	11 2 4.14	2.1901	5 26 14.9	10.454					
4	11 4 16.00	2.1902	5 15 47.0	10.475					
5	11 6 27.68	2.1933	5 5 17.9	10.496					
6	11 8 39.19	2.1904	4 54 47.5	10.516					
7	11 10 50.53	2.1877	4 44 16.0	10.533					
8	11 13 1.71	2.1849	4 33 43.5	10.550					
9	11 15 12.72	2.1822	4 23 10.0	10.567					
10	11 17 23.57	2.1795	4 12 35.5	10.582					
11	11 19 34.26	2.1768	4 2 0.1	10.597					
12	11 21 44.79	2.1742	3 51 23.9	10.610					
13	11 23 55.17	2.1717	3 40 46.9	10.622					
14	11 26 5.40	2.1692	3 30 9.2	10.633					
15	11 28 15.48	2.1667	3 19 30.9	10.643					
16	11 30 25.41	2.1643	3 8 52.0	10.653					
17	11 32 35.20	2.1620	2 58 12.5	10.661					
18	11 34 44.85	2.1597	2 47 32.6	10.668					
19	11 36 54.36	2.1574	2 36 52.3	10.675					
20	11 39 3.74	2.1552	2 26 11.6	10.681					
21	11 41 12.99	2.1531	2 15 30.6	10.685					
22	11 43 22.11	2.1510	2 4 49.4	10.689					
23	11 45 31.11	2.1489	N. 1 54 7.9	10.692					
MONDAY 30.					<p>           ☾ Apogee . . November    12    14.2            ☾ Perigee . . . . . 24    8.6         </p>				
0	11 47 39.98	2.1468	N. 1 43 26.3	10.694	<p>           ☾ Apogee . . November    12    14.2            ☾ Perigee . . . . . 24    8.6         </p>				
1	11 49 48.73	2.1442	1 32 44.6	10.694					
2	11 51 57.36	2.1429	1 22 3.0	10.693					
3	11 54 5.88	2.1410	1 11 21.4	10.692					
4	11 56 14.28	2.1391	1 0 39.9	10.690					
5	11 58 22.57	2.1373	0 49 58.6	10.687					
6	12 0 30.76	2.1356	0 39 17.4	10.684					
7	12 2 38.85	2.1339	0 28 36.5	10.679					
8	12 4 46.83	2.1322	0 17 55.9	10.673					
9	12 6 54.71	2.1306	N. 0 7 15.7	10.667					
10	12 9 2.50	2.1291	S. 0 3 24.1	10.660					
11	12 11 10.20	2.1275	0 14 3.5	10.652					
12	12 13 17.80	2.1260	0 24 42.3	10.642					
13	12 15 25.32	2.1246	0 35 20.5	10.632					
14	12 17 32.75	2.1232	0 45 58.1	10.621					
15	12 19 40.10	2.1218	0 56 35.0	10.609					
16	12 21 47.37	2.1205	1 7 11.2	10.596					
17	12 23 54.56	2.1192	1 17 46.5	10.582					
18	12 26 1.68	2.1180	1 28 21.0	10.567					
19	12 28 8.72	2.1168	1 38 54.6	10.552					
20	12 30 15.70	2.1157	1 49 27.2	10.536					
21	12 32 22.61	2.1147	1 59 58.9	10.519					
22	12 34 29.46	2.1136	2 10 29.5	10.501					
23	12 36 36.24	2.1125	2 20 59.0	10.482					
24	12 38 42.96	2.1116	S. 2 31 27.4	10.463					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Aldebaran W.	83° 43' 9"	9355	85° 27' 48"	9360	87° 12' 20"	9364	88° 56' 46"	9369
	SATURN W.	53 47 56	9365	55 32 21	9369	57 16 40	9373	59 0 54	9377
	Pollux W.	41 16 55	9548	42 57 1	9540	44 37 18	9534	46 17 44	9530
	SUN E.	67 11 30	9689	65 34 36	9685	63 57 50	9701	62 21 11	9706
2	Aldebaran W.	97 37 9	9396	99 20 51	9401	101 4 25	9406	102 47 51	9411
	SATURN W.	67 40 30	9400	69 24 5	9405	71 7 32	9410	72 50 52	9416
	Pollux W.	54 41 3	9590	56 21 48	9590	58 2 33	9592	59 43 16	9594
	SUN E.	54 19 50	9736	52 43 58	9743	51 8 15	9750	49 32 41	9757
3	SATURN W.	81 25 32	9445	83 8 2	9452	84 50 23	9458	86 32 35	9465
	Pollux W.	68 6 0	9540	69 46 18	9544	71 26 30	9548	73 6 36	9553
	Regulus W.	31 23 53	9400	33 6 3	9465	34 48 5	9470	36 30 0	9476
	SUN E.	41 37 19	9796	40 2 46	9805	38 28 25	9814	36 54 15	9824
4	SATURN W.	95 1 7	9509	96 42 17	9510	98 23 17	9517	100 4 6	9526
	Pollux W.	81 25 7	9585	83 4 22	9593	84 43 27	9600	86 22 22	9608
	Regulus W.	44 57 25	9509	46 38 26	9517	48 19 16	9525	49 59 55	9532
	SUN E.	29 6 48	9880	27 34 4	9894	26 1 37	9909	24 29 29	9925
8	SUN W.	19 42 30	3967	21 7 20	3969	22 32 8	3979	23 56 52	3976
	α Aquilæ E.	57 8 10	3471	55 47 14	3507	54 26 58	3545	53 7 24	3586
	Fomalhaut E.	88 48 4	3177	87 21 27	3186	85 55 4	3201	84 28 56	3214
9	SUN W.	30 58 51	3319	32 22 49	3319	33 46 38	3398	35 10 17	3337
	α Aquilæ E.	46 41 28	3699	45 26 59	3694	44 13 33	3659	43 1 13	4031
	Fomalhaut E.	77 22 8	3269	75 57 36	3266	74 33 22	3313	73 9 26	3329
10	SUN W.	42 6 7	3378	43 28 49	3386	44 51 21	3394	46 13 44	3401
	Fomalhaut E.	66 14 30	3416	64 52 32	3436	63 30 56	3455	62 9 42	3478
	α Pegasi E.	80 33 18	3292	79 7 47	3243	77 42 29	3255	76 17 25	3266
11	SUN W.	53 3 39	3435	54 25 16	3440	55 46 47	3446	57 8 11	3459
	Fomalhaut E.	55 29 36	3593	54 10 54	3621	52 52 42	3649	51 35 1	3679
	α Pegasi E.	69 15 20	3394	67 51 36	3335	66 28 5	3347	65 4 48	3359
12	SUN W.	63 53 56	3470	65 14 54	3479	66 35 49	3475	67 56 41	3477
	Fomalhaut E.	45 15 20	3685	44 1 25	3613	42 48 18	3629	41 36 1	4018
	α Pegasi E.	58 12 2	3496	56 50 15	3441	55 28 45	3456	54 7 32	3479
13	SUN W.	74 40 46	3477	76 1 36	3475	77 22 28	3473	78 43 22	3471
	VENUS W.	29 49 51	3677	31 7 2	3684	32 24 27	3651	33 42 6	3639
	Fomalhaut E.	35 49 55	4390	34 44 25	4499	33 40 26	4607	32 38 7	4738
	α Pegasi E.	47 26 20	3589	46 7 12	3593	44 48 30	3690	43 30 17	3649
	α Arietis E.	89 27 24	3196	88 1 10	3195	86 34 55	3193	85 8 38	3192
14	SUN W.	85 28 43	3451	86 50 2	3446	88 11 27	3439	89 32 59	3432
	VENUS W.	40 13 28	3584	41 32 20	3573	42 51 24	3569	44 10 40	3551
	α Arietis E.	77 56 35	3178	76 30 0	3175	75 3 21	3171	73 36 37	3167
	Aldebaran E.	110 34 56	3653	109 5 49	3647	107 36 35	3642	106 7 14	3636
15	SUN W.	96 22 45	3391	97 45 12	3389	99 7 49	3372	100 30 37	3362

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Aldebaran W.	90 41 5	9374	92 25 17	9379	94 9 22	9384	95 53 19	9389
	SATURN W.	60 45 2	9381	62 29 4	9386	64 12 59	9390	65 56 48	9395
	Pollux W.	47 58 16	9596	49 38 53	9593	51 19 34	9591	53 0 18	9590
	SUN E.	60 44 39	9719	59 8 15	9717	57 31 58	9794	55 55 50	9730
2	Aldebaran W.	104 31 10	9417	106 14 21	9493	107 57 23	9430	109 40 15	9496
	SATURN W.	74 34 4	9491	76 17 9	9497	78 0 5	9433	79 42 53	9439
	Pollux W.	61 23 56	9596	63 4 33	9598	64 45 7	9539	66 25 36	9535
	SUN E.	47 57 17	9764	46 22 2	9773	44 46 57	9780	43 12 3	9788
3	SATURN W.	88 14 38	9473	89 56 31	9480	91 38 13	9487	93 19 45	9494
	Pollux W.	74 46 35	9599	76 26 26	9596	78 6 8	9579	79 45 42	9576
	Regulus W.	38 11 47	9499	39 53 25	9499	41 34 54	9485	43 16 14	9502
	SUN E.	35 20 18	9834	33 46 34	9845	32 13 4	9856	30 39 48	9868
4	SATURN W.	101 44 43	9534	103 25 9	9543	105 5 23	9559	106 45 24	9561
	Pollux W.	88 1 6	9616	89 39 39	9605	91 18 0	9634	92 56 9	9643
	Regulus W.	51 40 24	9540	53 20 42	9548	55 0 48	9556	56 40 43	9566
	SUN E.	22 57 42	9949	21 26 17	9969	19 55 17	9965	18 24 46	3013
8	SUN W.	25 21 31	3989	26 46 3	3988	28 10 28	3996	29 34 44	3304
	$\alpha$ Aquilæ E.	51 48 34	3999	50 30 31	3975	49 13 17	3794	47 56 55	3776
	Fomalhaut E.	83 3 3	3996	81 37 25	3940	80 12 3	3953	78 46 57	3968
9	SUN W.	36 33 46	3345	37 57 6	3353	39 20 16	3392	40 43 16	3370
	$\alpha$ Aquilæ E.	41 50 4	4108	40 40 10	4194	39 31 38	4987	38 24 33	4389
	Fomalhaut E.	71 45 48	3345	70 22 29	3369	68 59 29	3379	67 36 49	3398
10	SUN W.	47 35 59	3409	48 58 5	3415	50 20 4	3483	51 41 55	3489
	Fomalhaut E.	60 48 51	3497	59 28 24	3590	58 8 22	3544	56 48 46	3567
	$\alpha$ Pegasi E.	74 52 34	3976	73 27 55	3988	72 3 30	3300	70 39 18	3319
11	SUN W.	58 29 29	3456	59 50 42	3480	61 11 51	3464	62 32 55	3467
	Fomalhaut E.	50 17 52	3711	49 1 17	3746	47 45 19	3783	46 29 59	3892
	$\alpha$ Pegasi E.	63 41 45	3372	62 18 57	3385	60 56 23	3399	59 34 5	3412
12	SUN W.	69 17 31	3478	70 38 20	3478	71 59 9	3479	73 19 57	3478
	Fomalhaut E.	40 24 39	4078	39 14 16	4144	38 4 57	4918	36 56 48	4300
	$\alpha$ Pegasi E.	52 46 37	3489	51 26 1	3508	50 5 46	3597	48 45 52	3547
13	SUN W.	80 4 18	3468	81 25 18	3464	82 46 22	3461	84 7 30	3456
	VENUS W.	34 59 58	3698	36 18 2	3616	37 36 19	3605	38 54 48	3595
	Fomalhaut E.	31 37 39	4885	30 39 12	5051	29 42 57	5945	28 49 9	5466
	$\alpha$ Pegasi E.	42 12 35	3679	40 55 26	3713	39 38 53	3759	38 23 1	3794
	$\alpha$ Arietis E.	83 42 19	3189	82 15 57	3188	80 49 33	3185	79 23 6	3189
14	SUN W.	90 54 39	3495	92 16 27	3418	93 38 23	3409	95 0 29	3400
	VENUS W.	45 30 8	3540	46 49 48	3598	48 9 41	3516	49 29 47	3505
	$\alpha$ Arietis E.	72 9 48	3163	70 42 54	3158	69 15 55	3153	67 48 50	3148
	Aldebaran E.	104 37 46	3030	103 8 10	3099	101 38 25	3014	100 8 30	3006
15	SUN W.	101 53 37	3351	103 16 50	3338	104 40 17	3397	106 3 57	3314

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
15	VENUS W.	50° 50' 6"	3499	52° 10' 39"	3480	53° 31' 25"	3467	54° 52' 26"	3454
	α Aquilæ W.	39 7 34	4870	40 14 54	4184	41 23 35	4105	42 33 32	4031
	α Arietis E.	66 21 38	3143	64 54 20	3137	63 26 55	3139	61 50 24	3196
	Aldebaran E.	98 38 25	9908	97 8 10	9969	95 37 43	9979	94 7 4	9980
16	SUN W.	107 27 52	3301	108 52 2	3088	110 16 27	3075	111 41 8	3061
	VENUS W.	61 41 20	3383	63 3 56	3368	64 26 49	3352	65 50 0	3337
	α Aquilæ W.	48 39 55	3734	49 56 6	3685	51 13 9	3639	52 31 1	3596
	α Arietis E.	54 40 7	3089	53 11 56	3065	51 43 40	3090	50 15 18	3088
	Aldebaran E.	86 30 33	9914	84 58 32	9901	83 26 15	9888	81 53 41	9875
17	SUN W.	118 48 45	3186	120 15 11	3171	121 41 55	3155	123 8 58	3136
	VENUS W.	72 50 34	3954	74 15 39	3936	75 41 5	3919	77 6 52	3901
	α Aquilæ W.	59 11 34	3405	60 33 45	3379	61 56 33	3340	63 19 58	3309
	α Arietis E.	42 52 34	3079	41 23 59	3069	39 55 27	3067	38 27 1	3064
	Aldebaran E.	74 6 29	9805	72 32 7	9790	70 57 26	9774	69 22 24	9759
	SATURN E.	103 31 41	9799	101 57 12	9784	100 22 23	9768	98 47 13	9759
18	VENUS W.	84 21 8	3110	85 49 5	3091	87 17 25	3073	88 46 8	3054
	α Aquilæ W.	70 25 44	3168	71 52 32	3143	73 19 50	3119	74 47 37	3095
	Fomalhaut W.	39 11 43	3678	40 28 53	3697	41 47 31	3691	43 7 32	3659
	Aldebaran E.	61 22 2	9678	59 44 53	9661	58 7 21	9645	56 29 27	9629
	SATURN E.	90 46 7	9679	89 8 49	9655	87 31 8	9638	85 53 5	9622
19	VENUS W.	96 15 26	9969	97 46 27	9943	99 17 51	9925	100 49 38	9908
	Fomalhaut W.	50 5 23	3173	51 32 4	3199	52 59 39	3085	54 28 7	3045
	α Pegasi W.	35 3 0	3370	36 25 51	3399	37 50 14	3318	39 16 2	3153
	Aldebaran E.	48 14 14	9544	46 34 2	9537	44 53 27	9511	43 12 29	9494
	SATURN E.	77 37 8	9538	75 56 47	9581	74 16 3	9505	72 34 57	9489
	Pollux E.	91 56 50	9696	90 18 31	9610	88 39 49	9593	87 0 44	9577
20	Fomalhaut W.	62 2 4	9673	63 34 57	9644	65 8 28	9617	66 42 34	9790
	α Pegasi W.	46 42 55	9695	48 15 20	9654	49 48 38	9616	51 22 45	9781
	Aldebaran E.	34 41 52	9414	32 58 37	9398	31 15 0	9383	29 31 1	9368
	SATURN E.	64 3 44	9410	62 20 23	9394	60 36 40	9380	58 52 36	9366
	Pollux E.	78 39 51	9499	76 58 36	9465	75 17 2	9472	73 35 9	9458
21	Fomalhaut W.	74 41 7	9679	76 18 15	9660	77 55 48	9643	79 33 45	9627
	α Pegasi W.	59 24 2	9635	61 2 10	9610	62 40 51	9588	64 20 3	9567
	SATURN E.	50 7 15	9300	48 21 15	9287	46 34 57	9277	44 48 23	9266
	Pollux E.	65 1 13	9400	63 17 38	9390	61 33 49	9382	59 49 48	9373
	Regulus E.	100 50 30	9309	99 4 34	9290	97 18 20	9277	95 31 47	9265
	MARS E.	109 4 56	9455	107 22 40	9441	105 40 4	9426	103 57 9	9416
22	Fomalhaut W.	87 48 27	9563	89 28 13	9554	91 8 11	9545	92 48 21	9539
	α Pegasi W.	72 42 42	9480	74 24 23	9467	76 6 23	9454	77 48 41	9443
	α Arietis W.	29 26 50	9799	31 3 0	9699	32 40 31	9610	34 19 12	9565
	SATURN E.	35 51 56	9293	34 4 3	9217	32 16 1	9213	30 27 53	9210
	Pollux E.	51 7 16	9348	49 22 27	9348	47 37 37	9348	45 52 47	9350
	Regulus E.	86 34 50	9219	84 46 41	9204	82 58 19	9195	81 9 44	9187
	MARS E.	95 18 21	9360	93 33 49	9350	91 49 3	9349	90 4 4	9333
	JUPITER E.	119 18 36	9254	117 31 29	9245	115 44 9	9237	113 56 37	9229

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
15	VENUS W.	56 13 41	3440	57 35 12	3487	58 56 58	3419	60 19 1	3398
	α Aquilæ W.	43 44 41	3093	44 56 58	3000	46 10 18	3841	47 24 38	3786
	α Arietis E.	60 31 46	3190	59 4 1	3115	57 36 10	3110	56 8 12	3104
	Aldebaran E.	92 36 13	2950	91 5 9	2948	89 33 51	2937	88 2 19	2926
16	SUN W.	113 6 5	3247	114 31 19	3232	115 56 50	3218	117 22 38	3202
	VENUS W.	67 13 29	3390	68 37 17	3305	70 1 23	3688	71 25 49	3671
	α Aquilæ W.	53 49 40	3554	55 9 5	3515	56 29 13	3477	57 50 3	3440
	α Arietis E.	48 46 51	3093	47 18 20	3080	45 49 46	3078	44 21 10	3078
	Aldebaran E.	80 20 50	2939	78 47 42	2948	77 14 16	2934	75 40 32	2919
17	SUN W.	124 36 21	3122	126 4 4	3106	127 32 6	3090	129 0 28	3073
	VENUS W.	78 33 0	3183	79 59 29	3165	81 26 20	3147	82 53 33	3139
	α Aquilæ W.	64 43 59	3279	66 8 35	3250	67 33 45	3229	68 59 28	3194
	α Arietis E.	36 58 44	3104	35 30 39	3117	34 2 50	3134	32 35 22	3157
	Aldebaran E.	67 47 2	2743	66 11 19	2737	64 35 15	2710	62 58 49	2695
	SATURN E.	97 11 42	2736	95 35 50	2730	93 59 37	2704	92 23 3	2688
18	VENUS W.	90 15 14	3035	91 44 43	3018	93 14 34	2990	94 44 48	2980
	α Aquilæ W.	76 15 53	3071	77 44 38	3048	79 13 51	3008	80 43 31	3005
	Fomalhaut W.	44 28 50	3368	45 51 20	3339	47 14 58	3274	48 39 40	3232
	Aldebaran E.	54 51 11	2612	53 12 32	2594	51 33 29	2577	49 54 3	2561
	SATURN E.	84 14 40	2905	82 35 52	2888	80 56 41	2871	79 17 6	2854
19	VENUS W.	102 21 47	2990	103 54 19	2979	105 27 14	2955	107 0 31	2938
	Fomalhaut W.	55 57 24	3007	57 27 28	2970	58 58 18	2936	60 29 51	2905
	α Pegasi W.	40 43 8	3091	42 11 28	3037	43 40 55	2986	45 11 25	2939
	Aldebaran E.	41 31 7	2477	39 49 22	2461	38 7 14	2445	36 24 44	2430
	SATURN E.	70 53 28	2473	69 11 36	2456	67 29 21	2440	65 46 43	2425
	Pollux E.	85 21 17	2561	83 41 28	2545	82 1 17	2530	80 20 45	2514
20	Fomalhaut W.	68 17 15	2766	69 52 28	2742	71 28 12	2730	73 4 25	2698
	α Pegasi W.	52 57 38	2748	54 33 14	2716	56 9 32	2687	57 46 29	2660
	Aldebaran E.	27 46 41	2354	26 2 0	2340	24 16 59	2308	22 31 38	2313
	SATURN E.	57 8 12	2351	55 23 27	2337	53 38 22	2324	51 52 58	2311
	Pollux E.	71 52 57	2445	70 10 26	2433	68 27 38	2421	66 44 33	2410
21	Fomalhaut W.	81 12 3	2612	82 50 42	2598	84 29 40	2585	86 8 56	2574
	α Pegasi W.	65 59 43	2548	67 39 50	2539	69 20 23	2511	71 1 21	2494
	SATURN E.	43 1 33	2256	41 14 28	2247	39 27 10	2238	37 39 39	2230
	Pollux E.	58 5 35	2386	56 21 12	2360	54 36 40	2355	52 52 1	2351
	Regulus E.	93 44 56	2253	91 57 48	2243	90 10 24	2232	88 22 44	2223
	MARS E.	102 13 57	2403	100 30 27	2392	98 46 41	2381	97 2 39	2370
22	Fomalhaut W.	94 28 40	2533	96 9 7	2520	97 49 40	2505	99 30 18	2494
	α Pegasi W.	79 31 15	2439	81 14 4	2423	82 57 6	2415	84 40 20	2408
	α Arietis W.	35 58 55	2506	37 39 32	2492	39 20 57	2461	41 3 5	2434
	SATURN E.	28 39 40	2208	26 51 24	2207	25 3 7	2208	23 14 52	2213
	Pollux E.	44 8 0	2354	42 23 19	2350	40 38 46	2308	38 54 25	2300
	Regulus E.	79 20 57	2180	77 31 59	2173	75 42 51	2167	73 53 34	2161
	MARS E.	88 18 53	2396	86 33 31	2318	84 47 58	2312	83 2 16	2306
	JUPITER E.	112 8 53	2922	110 20 58	2914	108 32 52	2908	106 44 36	2902

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	$\alpha$ Arietis W.	42° 45' 51"	2410	44° 29' 11"	2300	46° 13' 0"	2371	47° 57' 16"	2355
	Pollux E.	37 10 21	2394	35 26 37	2412	33 43 19	2434	32 0 33	2409
	Regulus E.	72 4 8	2156	70 14 34	2152	68 24 54	2148	66 35 8	2145
	MARS E.	81 16 25	2300	79 30 26	2296	77 44 20	2291	75 58 8	2287
	JUPITER E.	104 56 12	2197	103 7 40	2192	101 19 0	2188	99 30 14	2185
24	$\alpha$ Arietis W.	56 43 34	2300	58 29 33	2293	60 15 42	2289	62 1 58	2285
	Aldebaran W.	22 43 6	2132	24 33 16	2132	26 23 26	2132	28 13 36	2133
	Regulus E.	57 25 21	2137	55 35 18	2137	53 45 15	2137	51 55 13	2130
	MARS E.	67 6 4	2279	65 19 34	2279	63 33 4	2279	61 46 34	2280
	JUPITER E.	90 25 25	2176	88 36 21	2175	86 47 16	2176	84 58 12	2176
	Spica E.	110 56 49	2146	109 7 0	2145	107 17 10	2145	105 27 20	2147
25	$\alpha$ Arietis W.	70 54 24	2277	72 40 57	2279	74 27 28	2281	76 13 56	2284
	Aldebaran W.	37 23 52	2145	39 13 43	2149	41 3 28	2153	42 53 6	2157
	Regulus E.	42 45 53	2154	40 56 16	2159	39 6 46	2163	37 17 23	2168
	MARS E.	52 54 45	2294	51 8 37	2299	49 22 36	2304	47 36 42	2309
	JUPITER E.	75 53 26	2188	74 4 41	2192	72 16 2	2196	70 27 29	2201
	Spica E.	96 18 46	2158	94 29 15	2162	92 39 50	2166	90 50 31	2171
	SUN E.	137 20 15	2487	135 47 44	2490	134 6 17	2493	132 24 54	2496
26	Aldebaran W.	51 59 22	2186	53 48 10	2194	55 36 47	2201	57 25 13	2208
	SATURN W.	23 21 17	2231	25 8 58	2230	26 56 41	2231	28 44 23	2233
	MARS E.	38 49 25	2344	37 4 29	2353	35 19 46	2362	33 35 16	2371
	JUPITER E.	61 26 43	2231	59 39 1	2237	57 51 29	2245	56 4 8	2252
	Spica E.	81 45 56	2200	79 57 29	2207	78 9 12	2215	76 21 7	2223
	SUN E.	123 59 28	2523	122 18 47	2530	120 38 15	2537	118 57 53	2544
27	Aldebaran W.	66 24 30	2249	68 11 45	2258	69 58 46	2267	71 45 34	2277
	SATURN W.	37 41 37	2257	39 28 40	2264	41 15 33	2271	43 2 15	2279
	Pollux W.	25 4 39	2217	26 40 56	2272	28 18 14	2285	29 56 21	2297
	JUPITER E.	47 10 16	2294	45 24 7	2302	43 38 11	2311	41 52 28	2320
	Spica E.	67 23 40	2266	65 36 50	2274	63 50 13	2284	62 3 50	2294
	SUN E.	110 38 46	2587	108 59 33	2596	107 20 32	2605	105 41 44	2615
28	Aldebaran W.	80 36 7	2324	82 21 32	2334	84 6 42	2344	85 51 38	2353
	SATURN W.	51 52 50	2321	53 38 19	2329	55 23 36	2338	57 8 40	2348
	Pollux W.	38 14 16	2235	39 54 40	2230	41 35 11	2237	43 15 46	2252
	JUPITER E.	33 7 17	2368	31 22 56	2378	29 38 50	2388	27 54 58	2398
	Spica E.	53 15 37	2346	51 30 44	2356	49 46 6	2367	48 1 44	2379
	SUN E.	97 31 6	2666	95 53 40	2676	94 16 28	2687	92 39 30	2697
29	Aldebaran W.	94 32 42	2403	96 16 12	2413	97 59 28	2423	99 42 30	2433
	SATURN W.	65 50 35	2395	67 34 17	2405	69 17 45	2415	71 0 59	2424
	Pollux W.	51 38 42	2235	53 19 7	2239	54 59 26	2243	56 39 39	2249
	Spica E.	39 24 7	2438	37 41 27	2452	35 59 6	2465	34 17 3	2478
	SUN E.	84 38 17	2752	83 2 46	2763	81 27 29	2773	79 52 26	2785
30	SATURN W.	79 33 48	2472	81 15 41	2481	82 57 21	2490	84 38 48	2500
	Pollux W.	64 58 42	2581	66 38 3	2588	68 17 15	2595	69 56 17	2603
	Regulus W.	28 14 30	2500	29 55 43	2508	31 36 45	2516	33 17 36	2525
	SUN E.	72 0 48	2639	70 27 11	2650	68 53 48	2661	67 20 39	2672



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	$\alpha$ Arietis W.	49 41 55	9341	51 26 55	9386	53 12 13	9318	54 57 47	9309
	Pollux E.	30 18 27	9497	28 37 9	9539	26 56 50	9592	25 17 44	9658
	Regulus E.	64 45 17	9148	62 55 22	9140	61 5 24	9138	59 15 23	9137
	MARS E.	74 11 50	9285	72 25 28	9292	70 39 2	9281	68 52 34	9279
	JUPITER E.	97 41 24	9182	95 52 29	9179	94 3 30	9177	92 14 28	9176
24	$\alpha$ Arietis W.	63 48 20	9261	65 34 47	9279	67 21 18	9277	69 7 51	9277
	Aldebaran W.	30 3 45	9134	31 53 52	9136	33 43 56	9139	35 33 56	9141
	Regulus E.	50 5 14	9141	48 15 18	9143	46 25 25	9146	44 35 36	9150
	MARS E.	60 0 5	9262	58 13 39	9265	56 27 17	9267	54 40 59	9260
	JUPITER E.	83 9 9	9178	81 20 8	9180	79 31 10	9182	77 42 16	9185
	Spica E.	103 37 32	9148	101 47 46	9149	99 58 2	9152	98 8 22	9155
25	$\alpha$ Arietis W.	78 0 19	9267	79 46 37	9291	81 32 49	9296	83 18 55	9301
	Aldebaran W.	44 42 38	9163	46 32 2	9169	48 21 17	9174	50 10 24	9180
	Regulus E.	35 28 9	9175	33 39 4	9182	31 50 10	9190	30 1 27	9198
	MARS E.	45 50 56	9315	44 5 18	9322	42 19 50	9326	40 34 32	9336
	JUPITER E.	68 39 3	9206	66 50 45	9212	65 2 35	9218	63 14 34	9225
	Spica E.	89 1 19	9176	87 12 15	9182	85 23 20	9187	83 34 33	9194
	SUN E.	130 43 35	9500	129 2 22	9505	127 21 16	9511	125 40 18	9517
26	Aldebaran W.	59 13 28	9216	61 1 31	9225	62 49 22	9232	64 37 2	9240
	SATURN W.	30 32 2	9236	32 19 36	9240	34 7 4	9245	35 54 25	9251
	MARS E.	31 51 0	9282	30 6 59	9292	28 23 13	9294	26 39 44	9297
	JUPITER E.	54 16 58	9260	52 30 0	9268	50 43 13	9276	48 56 38	9285
	Spica E.	74 33 13	9231	72 45 31	9239	70 58 1	9247	69 10 44	9256
	SUN E.	117 17 41	9552	115 37 40	9560	113 57 50	9569	112 18 12	9577
27	Aldebaran W.	73 32 8	9266	75 18 28	9295	77 4 35	9304	78 50 28	9314
	SATURN W.	44 48 46	9266	46 35 6	9295	48 21 13	9303	50 7 8	9319
	Pollux W.	31 35 7	9584	33 14 24	9567	34 54 4	9563	36 34 3	9543
	JUPITER E.	40 6 58	9230	38 21 42	9239	36 36 40	9249	34 51 52	9258
	Spica E.	60 17 42	9204	58 31 49	9214	56 46 10	9224	55 0 46	9235
	SUN E.	104 3 9	9295	102 24 48	9325	100 46 40	9345	99 8 46	9355
28	Aldebaran W.	87 36 20	9264	89 20 47	9273	91 5 0	9284	92 48 58	9294
	SATURN W.	58 53 30	9257	60 38 7	9266	62 22 30	9276	64 6 39	9285
	Pollux W.	44 56 23	9525	46 37 1	9526	48 17 38	9528	49 58 12	9531
	JUPITER E.	26 11 20	9408	24 27 57	9418	22 44 48	9428	21 1 53	9438
	Spica E.	46 17 39	9291	44 33 51	9302	42 50 19	9314	41 7 4	9326
	SUN E.	91 2 46	9708	89 26 17	9719	87 50 3	9730	86 14 3	9741
29	Aldebaran W.	101 25 17	9443	103 7 50	9453	104 50 9	9462	106 32 15	9472
	SATURN W.	72 44 0	9433	74 26 47	9443	76 9 21	9453	77 51 41	9462
	Pollux W.	58 19 44	9554	59 59 42	9561	61 39 31	9567	63 19 11	9574
	Spica E.	32 35 19	9493	30 53 56	9508	29 12 54	9524	27 32 14	9541
	SUN E.	78 17 38	9795	76 43 4	9806	75 8 44	9818	73 34 39	9828
30	SATURN W.	86 20 1	9510	88 1 1	9519	89 41 48	9528	91 22 22	9537
	Pollux W.	71 35 8	9611	73 13 48	9618	74 52 18	9626	76 30 37	9635
	Regulus W.	34 58 15	9533	36 38 42	9542	38 18 57	9550	39 59 1	9559
	SUN E.	65 47 44	9893	64 15 3	9894	62 42 36	9904	61 10 22	9915

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from	
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.		Added to Apparent Time.	Diff. for 1 Hour.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Tues.	1	16 31 19.83	10.812	S. 21 53' 14.4"	-22.85	16 16.01	70.34	10 39.80	0.953
Wed.	2	16 35 39.68	10.839	22 2 10.3	21.79	16 16.15	70.42	10 16.57	0.980
Thur.	3	16 40 0.15	10.865	22 10 40.6	20.73	16 16.29	70.50	9 52.72	1.005
Frid.	4	16 44 21.22	10.890	22 18 45.2	-19.65	16 16.42	70.57	9 28.27	1.030
Sat.	5	16 48 42.86	10.913	22 26 23.9	18.56	16 16.55	70.65	9 3.26	1.053
SUN.	6	16 53 5.05	10.935	22 33 36.4	17.46	16 16.68	70.72	8 37.69	1.075
Mon.	7	16 57 27.77	10.955	22 40 22.3	-16.35	16 16.81	70.79	8 11.61	1.095
Tues.	8	17 1 50.96	10.975	22 46 41.5	15.24	16 16.93	70.85	7 45.05	1.115
Wed.	9	17 6 14.60	10.993	22 52 33.8	14.11	16 17.05	70.91	7 18.04	1.133
Thur.	10	17 10 38.66	11.010	22 57 59.0	-12.98	16 17.16	70.97	6 50.61	1.150
Frid.	11	17 15 3.10	11.025	23 2 56.9	11.84	16 17.27	71.02	6 22.80	1.165
Sat.	12	17 19 27.89	11.039	23 7 27.4	10.70	16 17.37	71.06	5 54.65	1.179
SUN.	13	17 23 52.99	11.051	23 11 30.2	- 9.55	16 17.47	71.11	5 26.19	1.191
Mon.	14	17 28 18.38	11.062	23 15 5.3	8.39	16 17.57	71.15	4 57.43	1.202
Tues.	15	17 32 44.02	11.072	23 18 12.5	7.22	16 17.66	71.18	4 28.42	1.212
Wed.	16	17 37 9.86	11.081	23 20 51.7	- 6.05	16 17.75	71.21	3 59.20	1.221
Thur.	17	17 41 35.92	11.089	23 23 2.9	4.87	16 17.83	71.24	3 29.80	1.228
Frid.	18	17 46 2.11	11.095	23 24 45.9	3.70	16 17.91	71.26	3 0.24	1.234
Sat.	19	17 50 28.44	11.099	23 26 0.7	- 2.52	16 17.98	71.28	2 30.55	1.238
SUN.	20	17 54 54.86	11.102	23 26 47.2	1.34	16 18.04	71.29	2 0.77	1.241
Mon.	21	17 59 21.32	11.104	23 27 5.4	- 0.16	16 18.10	71.30	1 30.94	1.243
Tues.	22	18 3 47.82	11.105	23 26 55.4	+ 1.01	16 18.16	71.30	1 1.09	1.244
Wed.	23	18 8 14.33	11.104	23 26 17.1	2.19	16 18.20	71.30	0 31.22	1.243
Thur.	24	18 12 40.83	11.103	23 25 10.4	3.37	16 18.24	71.29	0 1.35	1.242
Frid.	25	18 17 7.28	11.100	23 23 35.4	+ 4.55	16 18.27	71.28	0 28.46	1.230
Sat.	26	18 21 33.63	11.096	23 21 32.2	5.72	16 18.30	71.26	0 58.16	1.235
SUN.	27	18 25 59.85	11.090	23 19 0.8	6.89	16 18.32	71.24	1 27.74	1.229
Mon.	28	18 30 25.93	11.083	23 16 1.3	+ 8.06	16 18.34	71.21	1 57.18	1.222
Tues.	29	18 34 51.82	11.074	23 12 33.8	9.22	16 18.35	71.18	2 26.44	1.213
Wed.	30	18 39 17.50	11.064	23 8 38.4	10.38	16 18.36	71.15	2 55.49	1.204
Thur.	31	18 43 42.93	11.053	23 4 15.2	11.54	16 18.36	71.11	3 24.28	1.193
Frid.	32	18 48 8.06	11.041	S. 22 59 24.3	+12.69	16 18.35	71.07	3 52.78	1.180

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sidereal time.  
 The sign — prefixed to the hourly change of declination indicates that south declinations are increasing;  
 the sign + indicates that south declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to		Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Subtracted from Mean Time.			
Tues.	1	<sup>h</sup> 16 <sup>m</sup> 31 <sup>s</sup> 21.75	10.810	S. 21° 53' 18.5"	-22.84	<sup>m</sup> 10 <sup>s</sup> 39.63	0.953	<sup>h</sup> 16 <sup>m</sup> 42 <sup>s</sup> 1.38	
Wed.	2	16 35 41.54	10.837	22 2 14.0	21.78	10 16.40	0.980	16 45 57.94	
Thur.	3	16 40 1.94	10.863	22 10 44.0	20.72	9 52.56	1.005	16 49 54.50	
Frid.	4	16 44 22.94	10.887	22 18 48.3	-19.64	9 28.11	1.030	16 53 51.05	
Sat.	5	16 48 44.51	10.910	22 26 26.7	18.55	9 3.10	1.053	16 57 47.61	
Sun.	6	16 53 6.63	10.932	22 33 38.9	17.45	8 37.54	1.075	17 1 44.17	
Mon.	7	16 57 29.27	10.952	22 40 24.5	-16.34	8 11.46	1.095	17 5 40.73	
Tues.	8	17 1 52.38	10.972	22 46 43.4	15.23	7 44.90	1.115	17 9 37.28	
Wed.	9	17 6 15.94	10.990	22 52 35.5	14.10	7 17.90	1.133	17 13 33.84	
Thur.	10	17 10 39.92	11.007	22 58 0.5	-12.97	6 50.47	1.150	17 17 30.39	
Frid.	11	17 15 4.28	11.023	23 2 58.2	11.83	6 22.67	1.165	17 21 26.95	
Sat.	12	17 19 28.98	11.036	23 7 28.5	10.69	5 54.53	1.179	17 25 23.51	
Sun.	13	17 23 53.99	11.048	23 11 31.1	-9.54	5 26.08	1.191	17 29 20.07	
Mon.	14	17 28 19.30	11.059	23 15 6.0	8.38	4 57.33	1.202	17 33 16.63	
Tues.	15	17 32 44.85	11.069	23 18 13.1	7.21	4 28.33	1.212	17 37 13.18	
Wed.	16	17 37 10.62	11.078	23 20 52.2	-6.04	3 59.12	1.221	17 41 9.74	
Thur.	17	17 41 36.57	11.085	23 23 3.2	4.87	3 29.73	1.228	17 45 6.30	
Frid.	18	17 46 2.67	11.091	23 24 46.1	3.70	3 0.18	1.234	17 49 2.85	
Sat.	19	17 50 28.91	11.095	23 26 0.9	-2.52	2 30.50	1.238	17 52 59.41	
Sun.	20	17 54 55.24	11.098	23 26 47.3	1.34	2 0.73	1.241	17 56 55.97	
Mon.	21	17 59 21.61	11.100	23 27 5.4	-0.16	1 30.91	1.243	18 0 52.52	
Tues.	22	18 3 48.01	11.101	23 26 55.4	+1.01	1 1.07	1.244	18 4 49.08	
Wed.	23	18 8 14.43	11.100	23 26 17.1	2.19	0 31.21	1.243	18 8 45.63	
Thur.	24	18 12 40.84	11.099	23 25 10.4	3.37	0 1.35	1.242	18 12 42.19	
Frid.	25	18 17 7.20	11.096	23 23 35.5	+4.55	0 28.45	1.239	18 16 38.75	
Sat.	26	18 21 33.45	11.092	23 21 32.3	5.72	0 58.14	1.235	18 20 35.31	
Sun.	27	18 25 59.58	11.086	23 19 1.0	6.89	1 27.71	1.229	18 24 31.87	
Mon.	28	18 30 25.57	11.079	23 16 1.6	+8.06	1 57.14	1.222	18 28 28.43	
Tues.	29	18 34 51.37	11.070	23 12 34.2	9.22	2 26.39	1.213	18 32 24.98	
Wed.	30	18 39 16.96	11.061	23 8 38.9	10.38	2 55.43	1.204	18 36 21.53	
Thur.	31	18 43 42.30	11.049	23 4 15.8	11.53	3 24.21	1.192	18 40 18.09	
Frid.	32	18 48 7.35	11.037	S. 22° 59' 25.1"	+12.68	3 52.70	1.180	18 44 14.65	

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
 The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour,  
 + 9<sup>m</sup>.8565.  
 (Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	335	249° 31' 8.0"	30' 25.4"	152.19	— 0.17	9.9937206	— 26.4	<sup>h</sup> 7 <sup>m</sup> 16 <sup>s</sup> 46.86	
2	336	250 32 1.3	31 18.6	152.25	— 0.06	9.9936581	25.7	7 12 50.95	
3	337	251 32 55.9	32 13.1	152.30	+ 0.04	9.9935970	25.1	7 8 55.04	
4	338	252 33 51.8	33 8.8	152.35	+ 0.13	9.9935374	— 24.5	7 4 59.13	
5	339	253 34 48.8	34 5.6	152.40	0.19	9.9934793	23.9	7 1 3.21	
6	340	254 35 46.9	35 3.5	152.44	0.23	9.9934227	23.3	6 57 7.30	
7	341	255 36 46.0	36 2.5	152.48	+ 0.23	9.9933675	— 22.7	6 53 11.39	
8	342	256 37 45.9	37 2.3	152.51	0.19	9.9933137	22.0	6 49 15.48	
9	343	257 38 46.6	38 2.8	152.54	0.14	9.9932614	21.4	6 45 19.57	
10	344	258 39 48.0	39 4.0	152.57	+ 0.06	9.9932106	— 20.8	6 41 23.66	
11	345	259 40 50.0	40 5.9	152.60	— 0.05	9.9931615	20.1	6 37 27.75	
12	346	260 41 52.6	41 8.3	152.62	0.18	9.9931141	19.4	6 33 31.84	
13	347	261 42 55.6	42 11.1	152.64	— 0.31	9.9930686	— 18.6	6 29 35.92	
14	348	262 43 59.0	43 14.3	152.65	0.45	9.9930251	17.7	6 25 40.01	
15	349	263 45 2.8	44 17.9	152.67	0.58	9.9929838	16.8	6 21 44.10	
16	350	264 46 7.0	45 21.9	152.67	— 0.71	9.9929447	— 15.8	6 17 48.19	
17	351	265 47 11.5	46 26.3	152.69	0.82	9.9929081	14.7	6 13 52.28	
18	352	266 48 16.2	47 30.9	152.70	0.91	9.9928741	13.6	6 9 56.37	
19	353	267 49 21.3	48 35.8	152.72	— 0.96	9.9928427	— 12.5	6 6 0.45	
20	354	268 50 26.8	49 41.1	152.73	0.97	9.9928141	11.4	6 2 4.54	
21	355	269 51 32.6	50 46.7	152.75	0.96	9.9927882	10.2	5 58 8.64	
22	356	270 52 38.8	51 52.8	152.77	— 0.93	9.9927652	— 9.0	5 54 12.73	
23	357	271 53 45.5	52 59.4	152.79	0.88	9.9927451	7.8	5 50 16.82	
24	358	272 54 52.6	54 6.3	152.81	0.79	9.9927278	6.6	5 46 20.91	
25	359	273 56 0.2	55 13.7	152.83	— 0.69	9.9927132	— 5.4	5 42 25.00	
26	360	274 57 8.2	56 21.5	152.84	0.57	9.9927012	4.4	5 38 29.09	
27	361	275 58 16.7	57 29.9	152.86	0.44	9.9926918	3.3	5 34 33.17	
28	362	276 59 25.7	58 38.8	152.88	— 0.31	9.9926849	— 2.3	5 30 37.26	
29	363	277 60 35.1	59 48.0	152.90	0.18	9.9926803	1.4	5 26 41.36	
30	364	279 1 44.9	0 57.6	152.92	— 0.07	9.9926779	— 0.5	5 22 45.44	
31	365	280 2 55.1	2 7.6	152.93	+ 0.02	9.9926776	+ 0.3	5 18 49.53	
32	366	281 4 5.6	3 17.9	152.94	+ 0.09	9.9926792	+ 1.1	5 14 53.62	
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ , to the mean equinox of January 0 <sup>h</sup> .									Diff. for 1 Hour, — 9 <sup>s</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	15' 41.2	15' 36.8	57' 27.3	- 1.35	57' 11.3	- 1.39	<sup>h</sup> 20 <sup>m</sup> 36.7	<sup>m</sup> 2.00	<sup>d</sup> 24.6
2	15 32.5	15 28.3	56 55.5	1.30	56 40.1	1.27	21 24.7	2.01	25.6
3	15 24.2	15 20.2	56 25.1	1.24	56 10.4	1.21	22 13.1	2.02	26.6
4	15 16.3	15 12.6	55 56.1	- 1.17	55 42.3	- 1.13	23 1.9	2.04	27.6
5	15 8.9	15 5.4	55 28.9	1.09	55 16.1	1.04	23 50.9	2.05	28.6
6	15 2.1	14 59.0	55 3.8	0.99	54 52.3	0.92	<sup>d</sup>		29.6
7	14 56.0	14 53.4	54 41.6	- 0.85	54 31.9	- 0.76	0 40.0	2.04	0.9
8	14 51.1	14 49.1	54 23.3	0.66	54 16.0	0.55	1 28.6	2.01	1.9
9	14 47.5	14 46.3	54 10.1	0.42	54 5.8	- 0.20	2 16.3	1.96	2.9
10	14 45.6	14 45.5	54 3.3	- 0.13	54 2.7	+ 0.03	3 2.8	1.91	3.9
11	14 45.9	14 46.9	54 4.2	+ 0.22	54 8.0	0.41	3 48.0	1.86	4.9
12	14 48.6	14 50.9	54 14.1	0.62	54 22.7	0.82	4 32.3	1.83	5.9
13	14 53.9	14 57.6	54 33.7	+ 1.02	54 47.3	+ 1.24	5 15.9	1.81	6.9
14	15 2.0	15 7.0	55 3.4	1.44	55 21.9	1.64	5 59.6	1.83	7.9
15	15 12.7	15 19.0	55 42.8	1.82	56 5.8	2.00	6 44.1	1.88	8.9
16	15 25.7	15 33.0	56 30.7	+ 2.15	56 57.3	+ 2.26	7 30.3	1.97	9.9
17	15 40.5	15 48.3	57 25.0	2.34	57 53.5	2.38	8 18.9	2.09	10.9
18	15 56.1	16 3.8	58 22.2	2.37	58 50.5	2.31	9 10.7	2.24	11.9
19	16 11.2	16 18.1	59 17.6	+ 2.19	59 43.0	+ 2.01	10 6.1	2.39	12.9
20	16 24.3	16 29.7	60 5.9	1.77	60 25.7	1.49	11 5.0	2.52	13.9
21	16 34.1	16 37.4	60 41.8	1.17	60 53.8	0.81	12 6.4	2.59	14.9
22	16 39.4	16 40.2	61 1.2	+ 0.42	61 4.0	+ 0.04	13 8.6	2.58	15.9
23	16 39.7	16 38.0	61 2.2	- 0.34	60 55.9	- 0.70	14 9.6	2.50	16.9
24	16 35.1	16 31.3	60 45.5	1.01	60 31.4	1.31	15 8.2	2.38	17.9
25	16 26.6	16 21.2	60 14.2	- 1.54	59 54.5	- 1.72	16 3.7	2.25	18.9
26	16 15.3	16 9.1	59 32.8	1.86	59 9.8	1.95	16 56.3	2.14	19.9
27	16 2.6	15 56.1	58 46.1	1.99	58 22.1	1.99	17 46.6	2.06	20.9
28	15 49.6	15 43.3	57 58.3	- 1.96	57 35.1	- 1.91	18 35.3	2.01	21.9
29	15 37.2	15 31.3	57 12.6	1.83	56 51.1	1.73	19 23.2	1.99	22.9
30	15 25.8	15 20.6	56 30.9	1.63	56 11.9	1.52	20 11.0	1.99	23.9
31	15 15.8	15 11.3	55 54.2	1.42	55 37.8	1.31	20 58.9	2.01	24.9
32	15 7.3	15 3.5	55 22.8	- 1.19	55 9.1	- 1.09	21 47.2	2.02	25.9

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 1.					THURSDAY 3.				
0	12 38 42.96	2.1116	S. 2° 31' 27.4"	10.463	0	14 19 40.10	2.1066	S. 10° 15' 53.2"	8.600
1	12 40 49.63	2.1107	2 41 54.6	10.442	1	14 21 46.51	2.1072	10 24 27.5	8.543
2	12 42 56.25	2.1098	2 52 20.5	10.421	2	14 23 52.96	2.1077	10 32 58.4	8.486
3	12 45 2.81	2.1089	3 2 45.1	10.398	3	14 25 59.44	2.1082	10 41 25.8	8.429
4	12 47 9.32	2.1080	3 13 8.3	10.375	4	14 28 5.95	2.1088	10 49 49.8	8.370
5	12 49 15.79	2.1074	3 23 30.1	10.352	5	14 30 12.50	2.1095	10 58 10.2	8.311
6	12 51 22.21	2.1067	3 33 50.5	10.329	6	14 32 19.09	2.1101	11 6 27.1	8.252
7	12 53 28.59	2.1060	3 44 9.4	10.306	7	14 34 25.71	2.1107	11 14 40.4	8.191
8	12 55 34.93	2.1053	3 54 26.7	10.275	8	14 36 32.37	2.1113	11 22 50.0	8.129
9	12 57 41.23	2.1047	4 4 42.4	10.248	9	14 38 39.07	2.1120	11 30 55.9	8.068
10	12 59 47.50	2.1042	4 14 56.5	10.221	10	14 40 45.81	2.1127	11 38 58.1	8.006
11	13 1 53.74	2.1037	4 25 8.9	10.193	11	14 42 52.60	2.1134	11 46 56.6	7.943
12	13 3 59.95	2.1032	4 35 19.5	10.169	12	14 44 59.42	2.1140	11 54 51.3	7.880
13	13 6 6.13	2.1028	4 45 28.3	10.139	13	14 47 6.28	2.1147	12 2 42.2	7.816
14	13 8 12.29	2.1024	4 55 35.3	10.101	14	14 49 13.19	2.1155	12 10 29.2	7.751
15	13 10 18.42	2.1020	5 5 40.4	10.069	15	14 51 20.14	2.1162	12 18 12.3	7.686
16	13 12 24.53	2.1017	5 15 43.6	10.037	16	14 53 27.13	2.1168	12 25 51.5	7.620
17	13 14 30.69	2.1013	5 25 44.8	10.003	17	14 55 34.16	2.1175	12 33 26.7	7.553
18	13 16 36.69	2.1010	5 35 44.0	9.969	18	14 57 41.23	2.1182	12 40 57.0	7.486
19	13 18 42.75	2.1009	5 45 41.1	9.934	19	14 59 48.35	2.1190	12 48 25.1	7.419
20	13 20 48.80	2.1007	5 55 36.1	9.898	20	15 1 55.51	2.1197	12 55 48.2	7.351
21	13 22 54.83	2.1005	6 5 28.9	9.862	21	15 4 2.71	2.1204	13 3 7.2	7.283
22	13 25 0.86	2.1004	6 15 19.5	9.824	22	15 6 9.96	2.1211	13 10 22.1	7.213
23	13 27 6.88	2.1003	S. 6 25 7.8	9.787	23	15 8 17.25	2.1218	S. 13 17 32.8	7.143
WEDNESDAY 2.					FRIDAY 4.				
0	13 29 12.89	2.1002	S. 6 34 53.9	9.748	0	15 10 24.58	2.1226	S. 13 24 39.3	7.073
1	13 31 18.90	2.1002	6 44 37.6	9.708	1	15 12 31.96	2.1233	13 31 41.6	7.008
2	13 33 24.91	2.1002	6 54 18.9	9.667	2	15 14 39.38	2.1240	13 38 39.6	6.931
3	13 35 30.92	2.1002	7 3 57.7	9.627	3	15 16 46.84	2.1247	13 45 33.3	6.850
4	13 37 36.93	2.1003	7 13 34.1	9.585	4	15 18 54.35	2.1255	13 52 22.7	6.787
5	13 39 42.05	2.1003	7 23 7.9	9.543	5	15 21 1.90	2.1262	13 59 7.7	6.714
6	13 41 48.97	2.1004	7 32 39.2	9.500	6	15 23 9.50	2.1270	14 5 48.3	6.640
7	13 43 55.00	2.1006	7 42 7.9	9.456	7	15 25 17.14	2.1277	14 12 24.5	6.566
8	13 46 1.04	2.1008	7 51 33.9	9.411	8	15 27 24.82	2.1283	14 18 56.2	6.492
9	13 48 7.09	2.1009	8 0 57.2	9.366	9	15 29 32.54	2.1290	14 25 23.5	6.418
10	13 50 13.15	2.1011	8 10 17.8	9.319	10	15 31 40.30	2.1297	14 31 46.3	6.342
11	13 52 19.22	2.1013	8 19 35.5	9.272	11	15 33 48.11	2.1305	14 38 4.5	6.265
12	13 54 25.31	2.1016	8 28 50.4	9.224	12	15 35 55.96	2.1312	14 44 18.1	6.188
13	13 56 31.41	2.1018	8 38 2.4	9.176	13	15 38 3.65	2.1318	14 50 27.1	6.112
14	13 58 37.53	2.1022	8 47 11.6	9.126	14	15 40 11.77	2.1324	14 56 31.5	6.035
15	14 0 43.68	2.1026	8 56 17.8	9.078	15	15 42 19.74	2.1331	15 2 31.3	5.957
16	14 2 49.85	2.1030	9 5 21.0	9.028	16	15 44 27.75	2.1337	15 8 26.4	5.879
17	14 4 56.04	2.1033	9 14 21.1	8.976	17	15 46 35.79	2.1343	15 14 16.8	5.801
18	14 7 2.25	2.1037	9 23 18.1	8.924	18	15 48 43.87	2.1349	15 20 2.5	5.722
19	14 9 8.49	2.1042	9 32 12.0	8.872	19	15 50 51.98	2.1355	15 25 43.4	5.642
20	14 11 14.76	2.1047	9 41 2.7	8.819	20	15 53 0.13	2.1361	15 31 19.5	5.562
21	14 13 21.05	2.1051	9 49 50.2	8.765	21	15 55 8.32	2.1367	15 36 50.9	5.482
22	14 15 27.37	2.1056	9 58 34.5	8.711	22	15 57 16.54	2.1372	15 42 17.4	5.402
23	14 17 33.72	2.1061	10 7 15.5	8.656	23	15 59 24.79	2.1378	15 47 39.1	5.321
24	14 19 40.10	2.1066	S. 10 15 53.2	8.600	24	16 1 33.08	2.1384	S. 15 52 55.9	5.239

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
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## SATURDAY 5.

	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
0	16	1	33.08	2.1394	S. 15	52	55.9	5.930
1	16	3	41.40	2.1390	15	58	7.8	5.158
2	16	5	49.75	2.1393	16	3	14.8	5.076
3	16	7	58.12	2.1397	16	8	16.9	4.903
4	16	10	6.52	2.1400	16	13	14.0	4.910
5	16	12	14.95	2.1407	16	18	6.1	4.897
6	16	14	23.41	2.1419	16	22	53.2	4.743
7	16	16	31.89	2.1416	16	27	35.3	4.650
8	16	18	40.40	2.1420	16	32	12.3	4.575
9	16	20	48.93	2.1423	16	36	44.3	4.491
10	16	22	57.48	2.1427	16	41	11.2	4.406
11	16	25	6.05	2.1430	16	45	33.0	4.309
12	16	27	14.63	2.1439	16	49	49.8	4.237
13	16	29	23.23	2.1435	16	54	1.4	4.151
14	16	31	31.85	2.1437	16	58	7.9	4.045
15	16	33	40.48	2.1439	17	2	9.2	3.978
16	16	35	49.12	2.1443	17	6	5.3	3.899
17	16	37	57.78	2.1444	17	9	56.2	3.806
18	16	40	6.45	2.1445	17	13	42.0	3.719
19	16	42	15.12	2.1446	17	17	22.5	3.639
20	16	44	23.80	2.1447	17	20	57.8	3.544
21	16	46	32.49	2.1448	17	24	27.8	3.457
22	16	48	41.18	2.1448	17	27	52.6	3.369
23	16	50	49.87	2.1448	S. 17	31	12.2	3.282

## MONDAY 7.

	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
0	17	44	22.68	2.1367	S. 18	25	26.8	1.052
1	17	46	30.80	2.1349	18	26	27.2	0.969
2	17	48	38.87	2.1346	18	27	22.2	0.879
3	17	50	46.90	2.1334	18	28	11.8	0.789
4	17	52	54.88	2.1326	18	28	56.1	0.699
5	17	55	2.80	2.1316	18	29	35.0	0.603
6	17	57	10.67	2.1307	18	30	8.5	0.514
7	17	59	18.48	2.1297	18	30	36.7	0.425
8	18	1	26.24	2.1286	18	30	59.5	0.336
9	18	3	33.94	2.1277	18	31	17.0	0.247
10	18	5	41.57	2.1267	18	31	29.1	0.158
11	18	7	49.14	2.1257	18	31	35.9	- 0.069
12	18	9	56.65	2.1246	18	31	37.4	+ 0.019
13	18	12	4.09	2.1234	18	31	33.6	0.108
14	18	14	11.46	2.1223	18	31	24.5	0.197
15	18	16	18.77	2.1213	18	31	10.0	0.285
16	18	18	26.00	2.1199	18	30	50.3	0.379
17	18	20	33.16	2.1186	18	30	25.3	0.460
18	18	22	40.24	2.1173	18	29	55.1	0.548
19	18	24	47.24	2.1161	18	29	19.6	0.636
20	18	26	54.17	2.1148	18	28	38.9	0.723
21	18	29	1.02	2.1135	18	27	52.9	0.810
22	18	31	7.79	2.1121	18	27	1.7	0.897
23	18	33	14.47	2.1107	S. 18	26	5.3	0.983

## SUNDAY 6.

	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
0	16	52	58.56	2.1448	S. 17	34	26.4	3.194
1	16	55	7.25	2.1448	17	37	35.4	3.106
2	16	57	15.94	2.1447	17	40	39.1	3.017
3	16	59	24.62	2.1447	17	43	37.4	2.928
4	17	1	33.30	2.1446	17	46	30.5	2.840
5	17	3	41.97	2.1443	17	49	18.2	2.751
6	17	5	50.62	2.1441	17	52	0.6	2.662
7	17	7	59.26	2.1439	17	54	37.6	2.573
8	17	10	7.89	2.1437	17	57	9.3	2.484
9	17	12	16.51	2.1435	17	59	35.7	2.395
10	17	14	25.11	2.1439	18	1	56.7	2.306
11	17	16	33.69	2.1436	18	4	12.4	2.217
12	17	18	42.25	2.1435	18	6	22.7	2.127
13	17	20	50.79	2.1431	18	8	27.6	2.037
14	17	22	59.30	2.1417	18	10	27.1	1.947
15	17	25	7.79	2.1412	18	12	21.3	1.858
16	17	27	16.25	2.1407	18	14	10.1	1.769
17	17	29	24.68	2.1402	18	15	53.6	1.679
18	17	31	33.07	2.1398	18	17	31.6	1.589
19	17	33	41.43	2.1391	18	19	4.2	1.499
20	17	35	49.76	2.1385	18	20	31.5	1.410
21	17	37	58.05	2.1378	18	21	53.4	1.320
22	17	40	6.30	2.1372	18	23	9.9	1.230
23	17	42	14.51	2.1365	18	24	21.0	1.141
24	17	44	22.68	2.1357	S. 18	25	26.8	1.052

## TUESDAY 8.

	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
0	18	35	21.07	2.1099	S. 18	25	3.7	1.070
1	18	37	27.58	2.1077	18	23	56.9	1.156
2	18	39	34.00	2.1063	18	22	45.0	1.244
3	18	41	40.34	2.1049	18	21	27.9	1.337
4	18	43	46.59	2.1034	18	20	5.7	1.419
5	18	45	52.75	2.1018	18	18	38.4	1.498
6	18	47	58.81	2.1008	18	17	5.9	1.583
7	18	50	4.78	2.0987	18	15	28.4	1.667
8	18	52	10.65	2.0971	18	13	45.8	1.759
9	18	54	16.43	2.0955	18	11	58.1	1.837
10	18	56	22.11	2.0938	18	10	5.4	1.921
11	18	58	27.69	2.0920	18	8	7.6	2.005
12	19	0	33.17	2.0906	18	6	4.8	2.088
13	19	2	38.55	2.0887	18	3	57.0	2.171
14	19	4	43.82	2.0870	18	1	44.3	2.253
15	19	6	48.99	2.0853	17	59	26.6	2.336
16	19	8	54.06	2.0836	17	57	4.0	2.418
17	19	10	59.02	2.0818	17	54	36.5	2.499
18	19	13	3.87	2.0799	17	52	4.1	2.581
19	19	15	8.61	2.0781	17	49	26.8	2.663
20	19	17	13.24	2.0763	17	46	44.7	2.749
21	19	19	17.77	2.0746	17	43	57.7	2.832
22	19	21	22.19	2.0727	17	41	5.9	2.903
23	19	23	26.49	2.0708	17	38	9.3	2.983
24	19	25	30.68	2.0689	S. 17	35	7.9	3.069

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 9.					FRIDAY 11.				
0	19 25 30.68	2.0689	S. 17° 35' 7.9	3.068	0	21 2 34.41	1.9769	S. 13° 44' 10.3	6.396
1	19 27 34.76	2.0670	17 32 1.8	3.149	1	21 4 32.97	1.9752	13 37 44.6	6.457
2	19 29 38.72	2.0651	17 28 50.9	3.221	2	21 6 31.43	1.9734	13 31 15.5	6.514
3	19 31 42.57	2.0632	17 25 35.3	3.296	3	21 8 29.78	1.9717	13 24 42.9	6.579
4	19 33 46.31	2.0613	17 22 15.1	3.376	4	21 10 28.04	1.9701	13 18 6.8	6.630
5	19 35 49.93	2.0593	17 18 50.2	3.454	5	21 12 26.20	1.9685	13 11 27.3	6.687
6	19 37 53.43	2.0574	17 15 20.6	3.532	6	21 14 24.26	1.9669	13 4 44.3	6.744
7	19 39 56.82	2.0555	17 11 46.4	3.608	7	21 16 22.23	1.9654	12 57 58.0	6.800
8	19 42 0.09	2.0535	17 8 7.6	3.684	8	21 18 20.11	1.9638	12 51 8.3	6.856
9	19 44 3.24	2.0515	17 4 24.3	3.760	9	21 20 17.89	1.9623	12 44 15.3	6.911
10	19 46 6.27	2.0496	17 0 36.4	3.836	10	21 22 15.58	1.9608	12 37 19.0	6.965
11	19 48 9.19	2.0477	16 56 44.0	3.911	11	21 24 13.19	1.9594	12 30 19.5	7.019
12	19 50 11.99	2.0457	16 52 47.1	3.986	12	21 26 10.71	1.9579	12 23 16.7	7.073
13	19 52 14.67	2.0437	16 48 45.7	4.061	13	21 28 8.14	1.9565	12 16 10.7	7.127
14	19 54 17.23	2.0417	16 44 39.8	4.135	14	21 30 5.49	1.9551	12 9 1.5	7.179
15	19 56 19.67	2.0397	16 40 29.5	4.209	15	21 32 2.75	1.9537	12 1 49.2	7.232
16	19 58 21.99	2.0377	16 36 14.8	4.282	16	21 33 59.93	1.9524	11 54 33.7	7.284
17	20 0 24.19	2.0358	16 31 55.7	4.354	17	21 35 57.04	1.9512	11 47 15.1	7.335
18	20 2 26.28	2.0338	16 27 32.3	4.427	18	21 37 54.07	1.9499	11 39 53.5	7.386
19	20 4 28.25	2.0317	16 23 4.5	4.499	19	21 39 51.02	1.9486	11 32 28.8	7.437
20	20 6 30.09	2.0297	16 18 32.4	4.570	20	21 41 47.90	1.9473	11 25 1.1	7.487
21	20 8 31.81	2.0277	16 13 56.1	4.641	21	21 43 44.70	1.9461	11 17 30.4	7.537
22	20 10 33.42	2.0257	16 9 15.5	4.712	22	21 45 41.43	1.9450	11 9 56.7	7.586
23	20 12 34.90	2.0237	S. 16 4 30.6	4.783	23	21 47 38.10	1.9439	S. 11 2 20.1	7.636
THURSDAY 10.					SATURDAY 12.				
0	20 14 36.26	2.0217	S. 15 59 41.5	4.853	0	21 49 34.70	1.9427	S. 10 54 40.5	7.683
1	20 16 37.50	2.0197	15 54 48.2	4.922	1	21 51 31.23	1.9417	10 46 58.1	7.731
2	20 18 38.63	2.0178	15 49 50.8	4.991	2	21 53 27.70	1.9407	10 39 12.8	7.778
3	20 20 39.64	2.0158	15 44 49.3	5.059	3	21 55 24.11	1.9397	10 31 24.7	7.825
4	20 22 40.53	2.0138	15 39 43.7	5.128	4	21 57 20.46	1.9387	10 23 33.8	7.873
5	20 24 41.30	2.0119	15 34 34.0	5.196	5	21 59 16.76	1.9378	10 15 40.1	7.917
6	20 26 41.96	2.0100	15 29 20.2	5.263	6	22 1 13.00	1.9368	10 7 43.7	7.968
7	20 28 42.50	2.0080	15 24 2.4	5.330	7	22 3 9.18	1.9360	9 59 44.6	8.007
8	20 30 42.92	2.0061	15 18 40.6	5.396	8	22 5 5.32	1.9352	9 51 42.8	8.052
9	20 32 43.23	2.0042	15 13 14.9	5.462	9	22 7 1.41	1.9344	9 43 38.3	8.097
10	20 34 43.42	2.0022	15 7 45.2	5.527	10	22 8 57.45	1.9337	9 35 31.1	8.141
11	20 36 43.50	2.0003	15 2 11.6	5.592	11	22 10 53.45	1.9329	9 27 21.4	8.184
12	20 38 43.46	1.9984	14 56 34.1	5.657	12	22 12 49.40	1.9323	9 19 9.1	8.227
13	20 40 43.31	1.9966	14 50 52.7	5.722	13	22 14 45.32	1.9317	9 10 54.2	8.269
14	20 42 43.05	1.9947	14 45 7.5	5.785	14	22 16 41.20	1.9310	9 2 36.8	8.311
15	20 44 42.67	1.9928	14 39 18.5	5.848	15	22 18 37.04	1.9304	8 54 16.9	8.352
16	20 46 42.18	1.9909	14 33 25.7	5.911	16	22 20 32.85	1.9299	8 45 54.6	8.393
17	20 48 41.58	1.9892	14 27 29.2	5.973	17	22 22 28.63	1.9294	8 37 29.8	8.433
18	20 50 40.88	1.9874	14 21 28.9	6.036	18	22 24 24.38	1.9290	8 29 2.6	8.473
19	20 52 40.07	1.9856	14 15 24.9	6.098	19	22 26 20.11	1.9286	8 20 33.0	8.512
20	20 54 39.15	1.9838	14 9 17.3	6.158	20	22 28 15.81	1.9282	8 12 1.1	8.552
21	20 56 38.12	1.9820	14 3 5.9	6.219	21	22 30 11.49	1.9278	8 3 26.8	8.591
22	20 58 36.99	1.9803	13 56 50.9	6.279	22	22 32 7.15	1.9276	7 54 50.2	8.628
23	21 0 35.75	1.9786	13 50 32.4	6.338	23	22 34 2.80	1.9274	7 46 11.4	8.666
24	21 2 34.41	1.9769	S. 13 44 10.3	6.396	24	22 35 58.44	1.9272	S. 7 37 30.3	8.703



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 13.					TUESDAY 15.				
0	22 35 58.44	1.9873	S. 7° 37' 30.3"	8.703	0	0 9 7.44	1.9731	S. 0° 6' 16.6"	9.806
1	22 37 54.06	1.9870	7 28 47.0	8.740	1	0 11 5.89	1.9753	N. 0 3 37.6	9.908
2	22 39 49.68	1.9869	7 20 1.5	8.777	2	0 13 4.48	1.9777	0 13 32.4	9.918
3	22 41 45.29	1.9868	7 11 13.8	8.819	3	0 15 3.21	1.9800	0 23 27.8	9.988
4	22 43 40.90	1.9868	7 2 24.0	8.847	4	0 17 2.08	1.9833	0 33 23.8	9.938
5	22 45 36.51	1.9868	6 53 32.1	8.889	5	0 19 1.09	1.9847	0 43 20.4	9.947
6	22 47 32.12	1.9869	6 44 38.2	8.916	6	0 21 0.25	1.9879	0 53 17.5	9.955
7	22 49 27.74	1.9870	6 35 42.2	8.950	7	0 22 59.56	1.9898	1 3 15.0	9.969
8	22 51 23.36	1.9871	6 26 44.2	8.983	8	0 24 50.03	1.9904	1 13 13.0	9.970
9	22 53 18.99	1.9873	6 17 44.2	9.017	9	0 26 58.65	1.9950	1 23 11.4	9.976
10	22 55 14.64	1.9876	6 8 42.2	9.049	10	0 28 58.43	1.9978	1 33 10.1	9.981
11	22 57 10.30	1.9878	5 59 38.3	9.081	11	0 30 58.38	2.0006	1 43 9.1	9.986
12	22 59 5.98	1.9882	5 50 32.5	9.119	12	0 32 58.50	2.0034	1 53 8.4	9.990
13	23 1 1.68	1.9886	5 41 24.8	9.143	13	0 34 58.79	2.0069	2 3 7.9	9.998
14	23 2 57.41	1.9890	5 32 15.3	9.173	14	0 36 59.25	2.0099	2 13 7.6	9.997
15	23 4 53.16	1.9894	5 23 4.0	9.203	15	0 38 59.89	2.0129	2 23 7.5	9.999
16	23 6 48.94	1.9300	5 13 50.9	9.232	16	0 41 0.71	2.0159	2 33 7.5	10.000
17	23 8 44.76	1.9306	5 4 36.1	9.260	17	0 43 1.71	2.0189	2 43 7.5	10.000
18	23 10 40.61	1.9311	4 55 19.5	9.290	18	0 45 2.90	2.0214	2 53 7.5	9.999
19	23 12 36.49	1.9317	4 46 1.3	9.318	19	0 47 4.28	2.0246	3 3 7.4	9.998
20	23 14 32.42	1.9325	4 36 41.4	9.346	20	0 49 5.85	2.0278	3 13 7.3	9.997
21	23 16 28.39	1.9333	4 27 19.8	9.373	21	0 51 7.62	2.0312	3 23 7.1	9.995
22	23 18 24.41	1.9341	4 17 56.6	9.399	22	0 53 9.59	2.0346	3 33 6.7	9.998
23	23 20 20.48	1.9349	S. 4 8 31.9	9.425	23	0 55 11.77	2.0380	N. 3 43 6.1	9.997
MONDAY 14.					WEDNESDAY 16.				
0	23 22 16.60	1.9358	S. 3 59 5.6	9.451	0	0 57 14.15	2.0414	N. 3 53 5.2	9.989
1	23 24 12.78	1.9366	3 49 37.8	9.475	1	0 59 16.74	2.0450	4 3 4.0	9.977
2	23 26 9.02	1.9378	3 40 8.6	9.499	2	1 1 19.55	2.0486	4 13 2.5	9.972
3	23 28 5.32	1.9388	3 30 37.9	9.523	3	1 3 22.57	2.0522	4 23 0.6	9.965
4	23 30 1.68	1.9399	3 21 5.8	9.547	4	1 5 25.81	2.0559	4 32 58.3	9.957
5	23 31 58.11	1.9413	3 11 32.3	9.570	5	1 7 29.28	2.0597	4 42 55.4	9.948
6	23 33 54.62	1.9424	3 1 57.4	9.592	6	1 9 32.97	2.0634	4 52 52.0	9.938
7	23 35 51.20	1.9437	2 52 21.2	9.614	7	1 11 36.89	2.0673	5 2 48.0	9.928
8	23 37 47.86	1.9450	2 42 43.7	9.635	8	1 13 41.05	2.0712	5 12 43.4	9.917
9	23 39 44.60	1.9463	2 33 5.0	9.655	9	1 15 45.44	2.0752	5 22 38.1	9.905
10	23 41 41.42	1.9477	2 23 25.1	9.675	10	1 17 50.07	2.0792	5 32 32.0	9.892
11	23 43 38.32	1.9491	2 13 44.0	9.695	11	1 19 54.94	2.0832	5 42 25.1	9.878
12	23 45 35.31	1.9506	2 4 1.7	9.714	12	1 22 0.05	2.0873	5 52 17.4	9.864
13	23 47 32.40	1.9523	1 54 18.3	9.732	13	1 24 5.41	2.0915	6 2 8.8	9.848
14	23 49 29.59	1.9539	1 44 33.8	9.750	14	1 26 11.03	2.0957	6 11 59.2	9.832
15	23 51 26.87	1.9556	1 34 48.3	9.768	15	1 28 16.90	2.1000	6 21 48.6	9.814
16	23 53 24.26	1.9574	1 25 1.7	9.785	16	1 30 23.03	2.1043	6 31 36.9	9.796
17	23 55 21.76	1.9592	1 15 14.1	9.801	17	1 32 29.42	2.1087	6 41 24.1	9.777
18	23 57 19.36	1.9609	1 5 25.6	9.816	18	1 34 36.07	2.1130	6 51 10.2	9.757
19	23 59 17.07	1.9628	0 55 36.2	9.831	19	1 36 42.98	2.1175	7 0 55.0	9.736
20	0 1 14.90	1.9648	0 45 45.9	9.846	20	1 38 50.17	2.1221	7 10 38.5	9.714
21	0 3 12.85	1.9668	0 35 54.7	9.860	21	1 40 57.63	2.1267	7 20 20.7	9.691
22	0 5 10.92	1.9689	0 26 2.7	9.873	22	1 43 5.37	2.1312	7 30 1.4	9.667
23	0 7 9.12	1.9710	0 16 10.0	9.884	23	1 45 13.38	2.1358	7 39 40.7	9.642
24	0 9 7.44	1.9731	S. 0 6 16.6	9.896	24	1 47 21.67	2.1406	N. 7 49 18.5	9.617

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 17.					SATURDAY 19.				
0	1 47 21.67	2.1406	N. 7 49' 18.5"	9.617	0	3 36 11.84	2.4087	N. 14 40' 17.5"	7.051
1	1 49 30.25	2.1453	7 58 54.7	9.590	1	3 38 36.17	2.4083	14 47 18.1	6.967
2	1 51 39.11	2.1501	8 8 29.2	9.562	2	3 41 0.84	2.4141	14 54 13.6	6.882
3	1 53 48.26	2.1549	8 18 2.1	9.533	3	3 43 25.86	2.4198	15 1 4.0	6.797
4	1 55 57.70	2.1597	8 27 33.2	9.503	4	3 45 51.22	2.4254	15 7 49.2	6.711
5	1 58 7.44	2.1647	8 37 2.5	9.472	5	3 48 16.91	2.4310	15 14 29.1	6.622
6	2 0 17.47	2.1697	8 46 29.9	9.440	6	3 50 42.94	2.4366	15 21 3.7	6.531
7	2 2 27.80	2.1747	8 55 55.3	9.407	7	3 53 9.31	2.4422	15 27 32.8	6.439
8	2 4 38.43	2.1797	9 5 18.7	9.373	8	3 55 36.01	2.4477	15 33 56.4	6.347
9	2 6 49.37	2.1848	9 14 40.1	9.338	9	3 58 3.03	2.4532	15 40 14.4	6.253
10	2 9 0.61	2.1899	9 23 59.3	9.302	10	4 0 30.39	2.4587	15 46 26.8	6.158
11	2 11 12.16	2.1951	9 33 16.3	9.265	11	4 2 58.08	2.4642	15 52 33.4	6.062
12	2 13 24.02	2.2003	9 42 31.1	9.227	12	4 5 26.09	2.4696	15 58 34.2	5.964
13	2 15 36.19	2.2055	9 51 43.5	9.187	13	4 7 54.43	2.4749	16 4 29.1	5.866
14	2 17 48.68	2.2108	10 0 53.5	9.146	14	4 10 23.08	2.4803	16 10 18.1	5.766
15	2 20 1.49	2.2162	10 10 1.0	9.104	15	4 12 52.05	2.4855	16 16 1.0	5.664
16	2 22 14.62	2.2215	10 19 6.0	9.062	16	4 15 21.34	2.4907	16 21 37.8	5.562
17	2 24 28.07	2.2268	10 28 8.4	9.017	17	4 17 50.94	2.4959	16 27 8.4	5.458
18	2 26 41.84	2.2322	10 37 8.1	8.972	18	4 20 20.85	2.5010	16 32 32.8	5.354
19	2 28 55.94	2.2377	10 46 5.1	8.925	19	4 22 51.06	2.5061	16 37 50.9	5.248
20	2 31 10.36	2.2431	10 54 59.3	8.878	20	4 25 21.58	2.5112	16 43 2.6	5.141
21	2 33 25.11	2.2486	11 3 50.5	8.830	21	4 27 52.40	2.5162	16 48 7.8	5.033
22	2 35 40.19	2.2541	11 12 38.7	8.779	22	4 30 23.52	2.5211	16 53 6.5	4.923
23	2 37 55.60	2.2597	N. 11 21 24.0	8.729	23	4 32 54.93	2.5258	N. 16 57 58.6	4.812
FRIDAY 18.					SUNDAY 20.				
0	2 40 11.35	2.2653	N. 11 30 6.2	8.677	0	4 35 26.62	2.5306	N. 17 2 44.0	4.701
1	2 42 27.44	2.2709	11 38 45.2	8.632	1	4 37 58.60	2.5353	17 7 22.7	4.598
2	2 44 43.86	2.2764	11 47 21.0	8.586	2	4 40 30.86	2.5400	17 11 54.6	4.475
3	2 47 0.61	2.2820	11 55 53.4	8.543	3	4 43 3.40	2.5446	17 16 19.7	4.361
4	2 49 17.70	2.2877	12 4 22.5	8.498	4	4 45 36.21	2.5491	17 20 37.9	4.244
5	2 51 35.13	2.2934	12 12 48.1	8.457	5	4 48 9.29	2.5535	17 24 49.0	4.127
6	2 53 52.91	2.2992	12 21 10.2	8.416	6	4 50 42.63	2.5578	17 28 53.1	4.009
7	2 56 11.03	2.3048	12 29 28.7	8.377	7	4 53 16.23	2.5621	17 32 50.1	3.890
8	2 58 29.49	2.3105	12 37 43.5	8.335	8	4 55 50.08	2.5663	17 36 39.9	3.770
9	3 0 48.29	2.3162	12 45 54.5	8.293	9	4 58 24.19	2.5705	17 40 22.5	3.649
10	3 3 7.44	2.3220	12 54 1.7	8.251	10	5 0 58.54	2.5744	17 43 57.8	3.527
11	3 5 26.93	2.3278	13 2 5.0	8.209	11	5 3 33.12	2.5783	17 47 25.8	3.405
12	3 7 46.77	2.3336	13 10 4.2	7.954	12	5 6 7.94	2.5822	17 50 46.4	3.282
13	3 10 6.95	2.3393	13 17 59.4	7.896	13	5 8 42.99	2.5860	17 53 59.6	3.157
14	3 12 27.48	2.3451	13 25 50.5	7.841	14	5 11 18.26	2.5896	17 57 5.2	3.031
15	3 14 48.36	2.3508	13 33 37.4	7.786	15	5 13 53.74	2.5932	18 0 3.3	2.905
16	3 17 9.58	2.3566	13 41 20.0	7.731	16	5 16 29.44	2.5967	18 2 53.8	2.778
17	3 19 31.15	2.3624	13 48 58.3	7.676	17	5 19 5.35	2.6001	18 5 36.7	2.651
18	3 21 53.07	2.3682	13 56 32.1	7.621	18	5 21 41.45	2.6034	18 8 11.9	2.522
19	3 24 15.33	2.3739	14 4 1.4	7.566	19	5 24 17.75	2.6066	18 10 39.4	2.393
20	3 26 37.94	2.3797	14 11 26.1	7.511	20	5 26 54.24	2.6097	18 12 59.1	2.263
21	3 29 0.90	2.3855	14 18 46.2	7.456	21	5 29 30.91	2.6128	18 15 11.0	2.132
22	3 31 24.20	2.3913	14 26 1.5	7.401	22	5 32 7.75	2.6154	18 17 15.0	2.001
23	3 33 47.85	2.3970	14 33 12.0	7.346	23	5 34 44.76	2.6182	18 19 11.1	1.870
24	3 36 11.84	2.4027	N. 14 40 17.5	7.291	24	5 37 21.94	2.6209	N. 18 20 59.4	1.739

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 21.					WEDNESDAY 23.				
0	<sup>h</sup> 5 <sup>m</sup> 37 <sup>s</sup> 21.94	2.6300	N. 18° 20' 59.4"	1.738	0	<sup>h</sup> 7 <sup>m</sup> 44 <sup>s</sup> 1.22	2.6119	N. 17° 7' 51.3"	4.715
1	5 39 59.27	2.6334	18 22 39.7	1.605	1	7 46 37.85	2.6090	17 3 4.7	4.838
2	5 42 36.75	2.6365	18 24 12.0	1.471	2	7 49 14.30	2.6060	16 58 10.7	4.961
3	5 45 14.38	2.6399	18 25 36.2	1.337	3	7 51 50.57	2.6030	16 53 9.4	5.089
4	5 47 52.14	2.6334	18 26 52.4	1.302	4	7 54 26.66	2.5999	16 48 0.8	5.203
5	5 50 30.03	2.6385	18 28 0.5	1.067	5	7 57 2.56	2.5968	16 42 45.0	5.333
6	5 53 8.04	2.6345	18 29 0.4	0.931	6	7 59 38.26	2.5933	16 37 22.0	5.449
7	5 55 46.17	2.6384	18 29 52.2	0.796	7	8 2 13.76	2.5899	16 31 51.9	5.560
8	5 58 24.41	2.6381	18 30 35.9	0.660	8	8 4 49.05	2.5865	16 26 14.8	5.677
9	6 1 2.74	2.6397	18 31 11.4	0.593	9	8 7 24.14	2.5830	16 20 30.7	5.792
10	6 3 41.17	2.6413	18 31 38.7	0.387	10	8 9 59.01	2.5794	16 14 39.7	5.907
11	6 6 19.69	2.6487	18 31 57.8	0.250	11	8 12 33.66	2.5757	16 8 41.8	6.021
12	6 8 58.29	2.6439	18 32 8.7	+0.112	12	8 15 8.09	2.5719	16 2 37.2	6.133
13	6 11 36.96	2.6451	18 32 11.3	-0.095	13	8 17 42.29	2.5681	15 56 25.9	6.244
14	6 14 15.70	2.6493	18 32 5.7	0.163	14	8 20 16.26	2.5643	15 50 7.9	6.355
15	6 16 54.50	2.6471	18 31 51.8	0.301	15	8 22 50.00	2.5603	15 43 43.3	6.464
16	6 19 33.35	2.6479	18 31 29.6	0.438	16	8 25 22.50	2.5563	15 37 12.2	6.579
17	6 22 12.25	2.6486	18 30 59.2	0.576	17	8 27 56.75	2.5523	15 30 34.7	6.678
18	6 24 51.18	2.6491	18 30 20.5	0.715	18	8 30 29.76	2.5481	15 23 50.9	6.783
19	6 27 30.14	2.6496	18 29 33.5	0.852	19	8 33 2.52	2.5439	15 17 0.8	6.887
20	6 30 9.13	2.6499	18 28 38.2	0.990	20	8 35 35.03	2.5397	15 10 4.5	6.990
21	6 32 48.13	2.6500	18 27 34.7	1.128	21	8 38 7.28	2.5353	15 3 2.0	7.092
22	6 35 27.13	2.6501	18 26 22.9	1.266	22	8 40 39.27	2.5310	14 55 53.4	7.192
23	6 38 6.14	2.6502	N. 18 25 2.8	1.404	23	8 43 11.00	2.5267	N. 14 48 38.9	7.291
TUESDAY 22.					THURSDAY 24.				
0	6 40 45.15	2.6500	N. 18 23 34.4	1.542	0	8 45 42.47	2.5223	N. 14 41 18.5	7.389
1	6 43 24.14	2.6497	18 21 57.8	1.679	1	8 48 13.67	2.5178	14 33 52.2	7.486
2	6 46 3.11	2.6493	18 20 13.0	1.816	2	8 50 44.60	2.5133	14 26 20.2	7.580
3	6 48 42.06	2.6488	18 18 19.9	1.953	3	8 53 15.26	2.5088	14 18 42.6	7.673
4	6 51 20.97	2.6482	18 16 18.6	2.090	4	8 55 45.65	2.5043	14 10 59.4	7.766
5	6 53 59.83	2.6474	18 14 9.1	2.226	5	8 58 15.76	2.4996	14 3 10.7	7.857
6	6 56 38.64	2.6466	18 11 51.5	2.362	6	9 0 45.60	2.4950	13 55 16.5	7.947
7	6 59 17.40	2.6455	18 9 25.7	2.497	7	9 3 15.16	2.4903	13 47 17.0	8.036
8	7 1 56.10	2.6443	18 6 51.8	2.632	8	9 5 44.44	2.4856	13 39 12.2	8.123
9	7 4 34.72	2.6430	18 4 9.8	2.767	9	9 8 13.43	2.4809	13 31 2.3	8.208
10	7 7 13.26	2.6417	18 1 19.8	2.901	10	9 10 42.14	2.4762	13 22 47.3	8.292
11	7 9 51.72	2.6403	17 58 21.7	3.035	11	9 13 10.57	2.4714	13 14 27.2	8.376
12	7 12 30.10	2.6388	17 55 15.6	3.168	12	9 15 38.71	2.4666	13 6 2.2	8.457
13	7 15 8.38	2.6371	17 52 1.5	3.301	13	9 18 6.56	2.4618	12 57 32.4	8.537
14	7 17 46.55	2.6353	17 48 39.5	3.433	14	9 20 34.12	2.4570	12 48 57.8	8.616
15	7 20 24.61	2.6334	17 45 9.6	3.564	15	9 23 1.40	2.4522	12 40 18.5	8.693
16	7 23 2.56	2.6314	17 41 31.8	3.696	16	9 25 28.39	2.4474	12 31 34.6	8.769
17	7 25 40.38	2.6293	17 37 46.1	3.826	17	9 27 55.09	2.4426	12 22 46.2	8.844
18	7 28 18.08	2.6272	17 33 52.7	3.954	18	9 30 21.49	2.4378	12 13 53.3	8.917
19	7 30 55.65	2.6249	17 29 51.6	4.082	19	9 32 47.60	2.4329	12 4 56.1	8.987
20	7 33 33.07	2.6224	17 25 42.8	4.211	20	9 35 13.43	2.4280	11 55 54.6	9.059
21	7 36 10.34	2.6199	17 21 26.3	4.338	21	9 37 38.96	2.4231	11 46 49.0	9.128
22	7 38 47.46	2.6173	17 17 2.2	4.465	22	9 40 4.20	2.4182	11 37 39.3	9.196
23	7 41 24.42	2.6147	17 12 30.5	4.591	23	9 42 29.15	2.4134	11 28 25.5	9.262
24	7 44 1.22	2.6119	N. 17 7 51.3	4.715	24	9 44 53.81	2.4086	N. 11 19 7.8	9.327

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 25.					SUNDAY 27.				
0	9 44 53.81	2.4088	N. 11° 19' 7.8"	9.397	0	11 35 18.08	2.9043	N. 3° 2' 13.4"	10.894
1	9 47 18.18	2.4037	11 9 46.3	9.390	1	11 37 30.24	2.9011	2 51 19.6	10.898
2	9 49 42.26	2.3988	11 0 21.0	9.458	2	11 39 42.21	2.1979	2 40 25.6	10.901
3	9 52 6.04	2.3939	10 50 52.0	9.513	3	11 41 53.99	2.1948	2 29 31.5	10.903
4	9 54 29.53	2.3890	10 41 19.4	9.573	4	11 44 5.58	2.1917	2 18 37.3	10.906
5	9 56 52.74	2.3844	10 31 43.3	9.630	5	11 46 16.09	2.1886	2 7 43.2	10.908
6	9 59 15.66	2.3796	10 22 3.8	9.687	6	11 48 28.21	2.1855	1 56 49.1	10.901
7	10 1 38.29	2.3748	10 12 20.9	9.749	7	11 50 39.25	2.1825	1 45 55.1	10.898
8	10 4 0.63	2.3700	10 2 34.8	9.795	8	11 52 50.11	2.1796	1 35 1.4	10.894
9	10 6 22.69	2.3652	9 52 45.5	9.847	9	11 55 0.80	2.1767	1 24 7.9	10.889
10	10 8 44.46	2.3605	9 42 53.1	9.898	10	11 57 11.31	2.1738	1 13 14.7	10.883
11	10 11 5.95	2.3558	9 32 57.7	9.948	11	11 59 21.66	2.1711	1 2 21.9	10.877
12	10 13 27.16	2.3511	9 22 59.3	9.997	12	12 1 31.84	2.1684	0 51 29.5	10.880
13	10 15 48.08	2.3464	9 12 58.1	10.043	13	12 3 41.86	2.1657	0 40 37.6	10.881
14	10 18 8.73	2.3418	9 2 54.1	10.089	14	12 5 51.72	2.1630	0 29 46.2	10.882
15	10 20 29.10	2.3373	8 52 47.4	10.133	15	12 8 1.42	2.1604	0 18 55.4	10.841
16	10 22 49.19	2.3326	8 42 38.1	10.177	16	12 10 10.97	2.1578	N. 0 8 5.3	10.889
17	10 25 9.01	2.3280	8 32 26.2	10.218	17	12 12 20.36	2.1553	S. 0 2 44.1	10.817
18	10 27 28.55	2.3234	8 22 11.9	10.258	18	12 14 29.61	2.1530	0 13 32.8	10.805
19	10 29 47.82	2.3189	8 11 55.2	10.297	19	12 16 38.72	2.1506	0 24 20.7	10.791
20	10 32 6.82	2.3144	8 1 36.2	10.335	20	12 18 47.68	2.1482	0 35 7.7	10.775
21	10 34 25.55	2.3100	7 51 15.0	10.373	21	12 20 56.50	2.1459	0 45 53.7	10.759
22	10 36 44.02	2.3056	7 40 51.6	10.407	22	12 23 5.19	2.1437	0 56 38.7	10.743
23	10 39 2.22	2.3013	N. 7 30 26.2	10.440	23	12 25 13.74	2.1414	S. 1 7 22.8	10.798
SATURDAY 26.					MONDAY 28.				
0	10 41 20.16	2.3968	N. 7 19 58.8	10.479	0	12 27 22.16	2.1393	S. 1 18 5.8	10.707
1	10 43 37.84	2.3925	7 9 29.5	10.504	1	12 29 30.46	2.1372	1 28 47.6	10.688
2	10 45 55.26	2.3883	6 58 58.3	10.534	2	12 31 38.63	2.1350	1 39 28.3	10.667
3	10 48 12.43	2.3840	6 48 25.4	10.563	3	12 33 46.68	2.1330	1 50 7.7	10.646
4	10 50 29.34	2.3798	6 37 50.8	10.591	4	12 35 54.61	2.1319	2 0 45.8	10.624
5	10 52 46.00	2.3756	6 27 14.5	10.617	5	12 38 2.43	2.1293	2 11 22.6	10.602
6	10 55 2.41	2.3714	6 16 36.7	10.649	6	12 40 10.13	2.1274	2 21 58.0	10.578
7	10 57 18.57	2.3673	6 5 57.5	10.686	7	12 42 17.72	2.1257	2 32 32.0	10.554
8	10 59 34.49	2.3633	5 55 16.8	10.689	8	12 44 25.21	2.1240	2 43 4.5	10.538
9	11 1 50.17	2.3593	5 44 34.8	10.711	9	12 46 32.60	2.1223	2 53 35.4	10.502
10	11 4 5.61	2.3553	5 33 51.5	10.731	10	12 48 39.88	2.1206	3 4 4.8	10.476
11	11 6 20.81	2.3514	5 23 7.1	10.749	11	12 50 47.07	2.1190	3 14 32.5	10.448
12	11 8 35.78	2.3475	5 12 21.6	10.767	12	12 52 54.16	2.1174	3 24 58.5	10.419
13	11 10 50.51	2.3437	5 1 35.0	10.785	13	12 55 1.16	2.1159	3 35 22.8	10.390
14	11 13 5.02	2.3399	4 50 47.4	10.800	14	12 57 8.07	2.1144	3 45 45.3	10.361
15	11 15 19.30	2.3361	4 39 59.0	10.814	15	12 59 14.89	2.1129	3 56 6.1	10.331
16	11 17 33.35	2.3324	4 29 9.8	10.828	16	13 1 21.62	2.1116	4 6 25.0	10.299
17	11 19 47.19	2.3288	4 18 19.7	10.841	17	13 3 28.28	2.1103	4 16 41.9	10.266
18	11 22 0.81	2.3252	4 7 28.9	10.859	18	13 5 34.86	2.1090	4 26 56.9	10.233
19	11 24 14.21	2.3216	3 56 37.5	10.869	19	13 7 41.36	2.1078	4 37 9.9	10.200
20	11 26 27.40	2.3181	3 45 45.5	10.870	20	13 9 47.79	2.1068	4 47 20.9	10.165
21	11 28 40.38	2.3147	3 34 53.0	10.878	21	13 11 54.15	2.1054	4 57 20.7	10.129
22	11 30 53.15	2.3113	3 24 0.1	10.885	22	13 14 0.44	2.1043	5 7 36.4	10.094
23	11 33 5.72	2.3077	3 13 6.9	10.890	23	13 16 6.67	2.1032	5 17 41.0	10.058
24	11 35 18.08	2.3043	N. 3 2 13.4	10.894	24	13 18 12.83	2.1022	S. 5 27 43.4	10.021

GREENWICH MEAN TIME.									
THE MOON'S RIGHT ASCENSION AND DECLINATION.									
Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 29.					THURSDAY 31.				
0	<sup>h</sup> 13 <sup>m</sup> 18 <sup>s</sup> 12.83	2.1092	S. 5° 27' 43.4"	16.021	0	<sup>h</sup> 14 <sup>m</sup> 58 <sup>s</sup> 38.51	2.0937	S. 12° 33' 19.6"	7.483
1	13 20 18.93	2.1019	5 37 43.5	9.983	1	15 0 44.15	2.0942	12 40 46.6	7.417
2	13 22 24.98	2.1003	5 47 41.3	9.944	2	15 2 49.82	2.0947	12 48 9.6	7.350
3	13 24 30.97	2.0993	5 57 36.8	9.905	3	15 4 55.51	2.0951	12 55 28.6	7.283
4	13 26 36.90	2.0985	6 7 29.9	9.864	4	15 7 1.23	2.0956	13 2 43.6	7.215
5	13 28 42.79	2.0977	6 17 20.5	9.822	5	15 9 6.98	2.0960	13 9 54.4	7.146
6	13 30 48.63	2.0970	6 27 8.6	9.781	6	15 11 12.77	2.0967	13 17 1.1	7.077
7	13 32 54.43	2.0962	6 36 54.2	9.739	7	15 13 18.58	2.0971	13 24 3.6	7.008
8	13 35 0.18	2.0955	6 46 37.3	9.697	8	15 15 24.42	2.0977	13 31 2.0	6.938
9	13 37 5.89	2.0948	6 56 17.8	9.653	9	15 17 30.30	2.0982	13 37 56.2	6.867
10	13 39 11.56	2.0942	7 5 55.7	9.609	10	15 19 36.21	2.0987	13 44 46.1	6.797
11	13 41 17.20	2.0937	7 15 30.9	9.564	11	15 21 42.15	2.0992	13 51 31.8	6.726
12	13 43 22.80	2.0931	7 25 3.1	9.518	12	15 23 48.12	2.0998	13 58 13.2	6.654
13	13 45 28.37	2.0926	7 34 33.1	9.472	13	15 25 54.13	2.1004	14 4 50.3	6.582
14	13 47 33.91	2.0922	7 44 0.1	9.426	14	15 28 0.17	2.1009	14 11 23.0	6.509
15	13 49 39.43	2.0918	7 53 24.3	9.379	15	15 30 6.24	2.1015	14 17 51.3	6.436
16	13 51 44.92	2.0913	8 2 45.6	9.331	16	15 32 12.35	2.1021	14 24 15.3	6.363
17	13 53 50.39	2.0910	8 12 4.0	9.282	17	15 34 18.49	2.1027	14 30 34.8	6.288
18	13 55 55.84	2.0907	8 21 19.4	9.232	18	15 36 24.67	2.1032	14 36 49.9	6.214
19	13 58 1.27	2.0903	8 30 31.9	9.182	19	15 38 30.88	2.1038	14 43 0.5	6.139
20	14 0 6.68	2.0901	8 39 41.3	9.132	20	15 40 37.13	2.1045	14 49 6.6	6.065
21	14 2 12.08	2.0899	8 48 47.7	9.081	21	15 42 43.42	2.1051	14 55 8.3	5.990
22	14 4 17.47	2.0897	8 57 51.0	9.030	22	15 44 49.74	2.1057	15 1 5.4	5.913
23	14 6 22.84	2.0894	S. 9 6 51.2	8.977	23	15 46 56.10	2.1062	S. 15 6 57.9	5.837
WEDNESDAY 30.					FRIDAY, JANUARY 1, 1886.				
0	14 8 28.20	2.0893	S. 9 15 48.2	8.923	0	15 49 2.49	2.1068	S. 15 12 45.8	5.760
1	14 10 33.56	2.0892	9 24 42.0	8.870	PHASES OF THE MOON.				
2	14 12 38.91	2.0892	9 33 32.6	8.817					
3	14 14 44.26	2.0892	9 42 20.0	8.762	● New Moon December 6 1 16.6				
4	14 16 49.60	2.0891	9 51 4.0	8.707					
5	14 18 54.95	2.0892	9 59 44.7	8.650	☾ First Quarter . . . 14 6 21.8				
6	14 21 0.30	2.0892	10 8 22.0	8.593					
7	14 23 5.65	2.0893	10 16 55.9	8.536	○ Full Moon . . . . 21 8 58.6				
8	14 25 11.01	2.0894	10 25 26.4	8.479					
9	14 27 16.38	2.0895	10 33 53.4	8.421	☾ Last Quarter. . . . 28 0 21.7				
10	14 29 21.75	2.0896	10 42 16.9	8.362					
11	14 31 27.13	2.0897	10 50 36.9	8.303	☾ Apogee. . December 10 9.6				
12	14 33 32.52	2.0899	10 58 53.3	8.243					
13	14 35 37.92	2.0902	11 7 6.1	8.182	☾ Perigee. . . . . 22 13.3				
14	14 37 43.34	2.0904	11 15 15.2	8.122					
15	14 39 48.77	2.0907	11 23 20.7	8.061					
16	14 41 54.22	2.0910	11 31 22.5	7.999					
17	14 43 59.69	2.0913	11 39 20.5	7.936					
18	14 46 5.17	2.0915	11 47 14.8	7.872					
19	14 48 10.67	2.0918	11 55 5.3	7.809					
20	14 50 16.19	2.0922	12 2 51.9	7.745					
21	14 52 21.74	2.0926	12 10 34.7	7.681					
22	14 54 27.31	2.0930	12 18 13.6	7.616					
23	14 56 32.90	2.0933	12 25 48.6	7.550					
24	14 58 38.51	2.0937	S. 12 33 19.6	7.483					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	SATURN W.	93° 2' 44"	2546	94° 42' 53"	2556	96° 22' 49"	2564	98° 2' 33"	2574
	Pollux W.	78 8 45	2643	79 46 42	2651	81 24 28	2660	83 2 2	2668
	Regulus W.	41 38 53	2567	43 18 33	2576	44 58 1	2585	46 37 17	2593
	SUN E.	59 38 22	2926	58 6 36	2936	56 35 3	2947	55 3 44	2958
2	Pollux W.	91 7 0	2712	92 43 24	2720	94 19 37	2729	95 55 38	2738
	Regulus W.	54 50 41	2636	56 28 47	2645	58 6 41	2654	59 44 23	2662
	SUN E.	47 30 33	3013	46 0 36	3024	44 30 53	3035	43 1 24	3046
3	Pollux W.	103 52 37	2786	105 27 23	2795	107 1 57	2805	108 36 18	2815
	Regulus W.	67 50 6	2704	69 26 41	2712	71 3 5	2721	72 39 17	2729
	SUN E.	35 37 32	3107	34 9 31	3120	32 41 46	3133	31 14 17	3148
8	SUN W.	22 16 48	3504	23 37 8	3499	24 57 33	3496	26 18 2	3494
	Fomalhaut E.	58 46 11	3509	57 25 57	3539	56 6 8	3556	54 46 46	3582
	α Pegasi E.	72 51 6	3290	71 26 43	3300	70 2 32	3313	68 38 35	3324
9	SUN W.	33 0 43	3494	34 21 14	3495	35 41 44	3497	37 2 12	3497
	Fomalhaut E.	48 17 31	3738	47 1 24	3776	45 45 57	3818	44 31 13	3863
	α Pegasi E.	61 42 19	3389	60 19 50	3403	58 57 37	3418	57 35 41	3434
10	SUN W.	43 44 13	3503	45 4 34	3504	46 24 54	3504	47 45 14	3504
	Fomalhaut E.	38 30 24	4158	37 21 18	4237	36 13 27	4323	35 6 56	4419
	α Pegasi E.	50 50 49	3527	49 30 55	3550	48 11 26	3574	46 52 23	3599
	α Arietis E.	93 5 19	3125	91 39 8	3200	90 12 59	3292	88 46 52	3303
11	SUN W.	54 26 58	3500	55 47 22	3498	57 7 48	3496	58 28 17	3493
	α Arietis E.	81 36 37	3207	80 10 36	3208	78 44 36	3206	77 18 36	3207
	Aldebaran E.	114 17 38	3082	112 49 6	3082	111 20 34	3080	109 52 0	3078
12	SUN W.	65 11 34	3474	66 32 27	3469	67 53 26	3463	69 14 31	3456
	α Aquilæ W.	36 33 37	4590	37 36 10	4485	38 40 15	4389	39 45 46	4302
	α Arietis E.	70 8 24	3203	68 42 18	3201	67 16 10	3199	65 50 0	3197
	Aldebaran E.	102 28 26	3063	100 59 31	3058	99 30 30	3053	98 1 23	3048
13	SUN W.	76 1 54	3419	77 23 49	3410	78 45 54	3400	80 8 10	3391
	α Aquilæ W.	45 31 37	3961	46 43 55	3907	47 57 8	3856	49 11 12	3810
	VENUS W.	29 0 17	3479	30 21 5	3462	31 42 12	3446	33 3 37	3430
	α Arietis E.	58 38 33	3187	57 12 8	3184	55 45 40	3183	54 19 10	3181
	Aldebaran E.	90 34 0	3014	89 4 5	3008	87 34 0	2998	86 3 45	2989
14	SUN W.	87 2 31	3333	88 26 4	3321	89 49 51	3307	91 13 54	3294
	α Aquilæ W.	55 32 58	3608	56 51 24	3574	58 10 27	3540	59 30 7	3508
	VENUS W.	39 55 12	3351	41 18 25	3334	42 41 57	3318	44 5 48	3301
	α Arietis E.	47 6 15	3177	45 39 38	3178	44 13 3	3180	42 46 30	3183
	Aldebaran E.	78 29 29	2938	76 57 58	2926	75 26 12	2913	73 54 10	2901
	SATURN E.	106 7 33	2920	104 35 40	2909	103 3 32	2896	101 21 8	2883
15	SUN W.	98 18 17	3219	99 44 4	3203	101 10 10	3186	102 36 36	3169
	α Aquilæ W.	66 17 1	3362	67 40 1	3335	69 3 32	3309	70 27 33	3284
	VENUS W.	51 9 59	3214	52 35 51	3196	54 2 5	3178	55 28 41	3159
	Aldebaran E.	66 9 48	2831	64 36 1	2817	63 1 55	2801	61 27 29	2786

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	SATURN	W.	99° 42' 4"	2583	101° 21' 23"	2599	103° 0' 29"	2601	104° 39' 23"	2610
	Pollux	W.	84 39 25	2677	86 16 36	2685	87 53 36	2694	89 30 24	2703
	Regulus	W.	48 16 21	2602	49 55 13	2610	51 33 54	2619	53 12 23	2627
	SUN	E.	53 32 39	2669	52 1 47	2680	50 31 9	2690	49 0 44	2601
2	Pollux	W.	97 31 26	2748	99 7 2	2757	100 42 26	2766	102 17 38	2776
	Regulus	W.	61 21 54	2670	62 59 14	2678	64 36 23	2687	66 13 20	2696
	SUN	E.	41 32 8	3058	40 3 7	3069	38 34 20	3068	37 5 48	3096
3	Pollux	W.	110 10 26	2826	111 44 20	2836	113 18 1	2847	114 51 28	2857
	Regulus	W.	74 15 19	2737	75 51 10	2745	77 26 50	2753	79 2 19	2762
	SUN	E.	29 47 6	3163	28 20 13	3179	26 53 39	3197	25 27 26	3215
8	SUN	W.	27 38 33	3493	28 59 5	3499	30 19 38	3499	31 40 11	3493
	Fomalhaut	E.	53 27 52	3610	52 9 28	3638	50 51 35	3669	49 34 15	3703
	α Pegasi	E.	67 14 51	3336	65 51 21	3348	64 28 5	3361	63 5 4	3375
9	SUN	W.	38 22 39	3499	39 43 4	3500	41 3 28	3501	42 23 51	3509
	Fomalhaut	E.	43 17 16	3912	42 4 8	3965	40 51 54	4094	39 40 38	4087
	α Pegasi	E.	56 14 3	3451	54 52 44	3469	53 31 45	3487	52 11 6	3506
10	SUN	W.	49 5 34	3504	50 25 54	3504	51 46 14	3503	53 6 35	3501
	Fomalhaut	E.	34 1 52	4596	32 58 23	4646	31 56 38	4783	30 56 48	4937
	α Pegasi	E.	45 33 48	3628	44 15 44	3658	42 58 12	3691	41 41 15	3737
	α Arietis	E.	87 20 46	3904	85 54 42	3906	84 28 40	3906	83 2 38	3907
11	SUN	W.	59 48 49	3490	61 9 24	3487	62 30 3	3483	63 50 46	3479
	α Arietis	E.	75 52 35	3907	74 26 34	3906	73 0 32	3905	71 34 29	3904
	Aldebaran	E.	108 23 24	3076	106 54 45	3073	105 26 3	3070	103 57 17	3068
12	SUN	W.	70 35 44	3450	71 57 4	3443	73 18 32	3436	74 40 8	3427
	α Aquilæ	W.	40 52 37	4929	42 0 42	4149	43 9 57	4081	44 20 17	4090
	α Arietis	E.	64 23 47	3195	62 57 32	3193	61 31 15	3191	60 4 55	3189
	Aldebaran	E.	96 32 10	3043	95 2 50	3036	93 33 22	3029	92 3 45	3022
13	SUN	W.	81 30 37	3380	82 53 16	3369	84 16 8	3358	85 39 13	3346
	α Aquilæ	W.	50 26 4	3766	51 41 42	3723	52 58 5	3682	54 15 11	3644
	VENUS	W.	34 25 20	3414	35 47 21	3398	37 9 40	3382	38 32 17	3366
	α Arietis	E.	52 52 38	3180	51 26 5	3178	49 59 30	3177	48 32 53	3176
	Aldebaran	E.	84 33 19	2980	83 2 41	2969	81 31 50	2959	80 0 46	2949
14	SUN	W.	92 38 12	3280	94 2 47	3265	95 27 39	3250	96 52 49	3235
	α Aquilæ	W.	60 50 22	3477	62 11 12	3446	63 32 36	3417	64 54 33	3390
	VENUS	W.	45 29 58	3284	46 54 28	3267	48 19 18	3250	49 44 28	3232
	α Arietis	E.	41 20 1	3188	39 53 38	3195	38 27 23	3204	37 1 18	3215
	Aldebaran	E.	72 21 52	2988	70 49 18	2974	69 16 26	2960	67 43 16	2946
	SATURN	E.	99 58 28	2670	98 25 31	2657	96 52 17	2643	95 18 45	2629
15	SUN	W.	104 3 22	3152	105 30 29	3134	106 57 57	3117	108 25 46	3100
	α Aquilæ	W.	71 52 3	3259	73 17 3	3235	74 42 31	3210	76 8 28	3187
	VENUS	W.	56 55 39	3140	58 23 0	3121	59 50 44	3101	61 18 52	3082
	Aldebaran	E.	59 52 43	2770	58 17 36	2753	56 42 7	2737	55 6 16	2719

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
15	SATURN E.	93° 44' 55"	9815	92° 10' 46"	9799	90° 36' 17"	9785	89° 1' 29"	9769
16	SUN W.	109 53 56	3081	111 22 29	3061	112 51 26	3043	114 20 46	3023
	VENUS W.	62 47 24	3061	64 16 21	3049	65 45 42	3022	67 15 28	3001
	Fomalhaut W.	45 29 8	3429	46 50 52	3374	48 13 38	3323	49 37 23	3274
	α Pegasi W.	31 0 36	3623	32 15 14	3709	33 31 51	3807	34 50 18	3515
	Aldebaran E.	53 30 2	9783	51 53 26	9865	50 16 26	9867	48 39 2	9849
	SATURN E.	81 2 10	9886	79 25 11	9899	77 47 49	9859	76 10 4	9834
17	SUN W.	121 53 25	9927	123 25 10	9907	124 57 20	9887	126 29 55	9868
	VENUS W.	74 50 49	9896	76 23 13	9875	77 56 4	9853	79 29 23	9832
	Fomalhaut W.	56 49 41	3093	58 18 37	3036	59 48 18	3009	61 18 43	2986
	α Pegasi W.	41 45 28	3193	43 12 23	3106	44 40 25	3055	46 9 30	3007
	Aldebaran E.	40 25 53	9857	38 45 59	9838	37 5 39	9820	35 24 53	9801
	SATURN E.	67 55 11	9843	66 14 57	9825	64 34 18	9806	62 53 13	9787
	Pollux E.	84 19 50	9838	82 41 46	9820	81 3 18	9801	79 24 25	9783
18	VENUS W.	87 22 49	9727	88 58 53	9707	90 35 24	9687	92 12 22	9668
	Fomalhaut W.	69 1 2	9805	70 35 24	9777	72 10 22	9751	73 45 54	9726
	α Pegasi W.	53 48 57	9809	55 23 22	9768	56 58 32	9736	58 34 26	9703
	SATURN E.	54 21 20	9396	52 37 40	9379	50 53 35	9361	49 9 4	9344
	Pollux E.	71 3 52	9497	69 22 34	9480	67 40 52	9463	65 58 47	9448
19	VENUS W.	100 23 59	9589	102 3 37	9551	103 43 40	9533	105 24 8	9515
	Fomalhaut W.	81 51 29	9815	83 30 3	9806	85 9 3	9778	86 48 28	9760
	α Pegasi W.	66 43 55	9865	68 23 38	9840	70 3 55	9817	71 44 44	9796
	α Arietis W.	24 0 21	3078	25 28 57	3060	27 0 0	3040	28 33 10	3027
	SATURN E.	40 20 25	9263	38 33 31	9249	36 46 16	9235	34 58 41	9223
	Pollux E.	57 23 4	9378	55 38 57	9366	53 54 34	9355	52 9 55	9346
	Regulus E.	93 0 19	9386	91 13 30	9349	89 26 16	9333	87 38 37	9316
20	Fomalhaut W.	95 11 3	9493	96 52 28	9481	98 34 8	9472	100 16 1	9464
	α Arietis W.	36 42 35	9486	38 24 5	9448	40 6 32	9419	41 49 50	9389
	Pollux E.	43 23 50	9319	41 38 18	9290	39 52 47	9269	38 7 20	9248
	Regulus E.	78 34 39	9144	76 44 47	9139	74 54 36	9119	73 4 6	9107
	MARS E.	98 48 33	9947	97 1 16	9933	95 13 38	9920	93 25 41	9908
	JUPITER E.	114 47 39	9168	112 58 23	9155	111 8 47	9142	109 18 52	9130
21	α Arietis W.	50 36 38	9258	52 23 40	9240	54 11 8	9224	55 59 0	9210
	Regulus E.	63 47 25	9058	61 55 21	9051	60 3 6	9044	58 10 40	9037
	MARS E.	84 21 39	9157	82 32 6	9148	80 42 20	9141	78 52 23	9134
	JUPITER E.	100 5 2	9080	98 13 32	9073	96 21 49	9064	94 29 55	9056
22	α Arietis W.	65 2 57	9159	66 52 26	9153	68 42 4	9146	70 31 50	9145
	Aldebaran W.	31 22 37	9012	33 15 52	9010	35 9 11	9008	37 2 33	9007
	Regulus E.	48 46 26	9017	46 53 19	9016	45 0 10	9015	43 6 59	9015
	MARS E.	69 40 24	9111	67 49 42	9109	65 58 57	9108	64 8 10	9107
	JUPITER E.	85 8 15	9035	83 15 36	9034	81 22 55	9033	79 30 12	9032
	Spica E.	102 19 42	9097	100 26 50	9095	98 33 54	9093	96 40 55	9092
23	α Arietis W.	79 41 28	9142	81 31 23	9145	83 21 14	9149	85 10 59	9153
	Aldebaran W.	46 29 10	9016	48 22 19	9020	50 15 22	9025	52 8 18	9029



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## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
15	SATURN E.	87° 26' 20"	9753	85° 50' 50"	9737	84° 14' 59"	9730	82° 38' 46"	9703
16	SUN W.	115 50 30	3005	117 20 37	3005	118 51 8	3005	120 22 4	3046
	VENUS W.	68 45 40	3060	70 16 18	3050	71 47 22	3039	73 18 52	3017
	Fomalhaut W.	51 2 5	3037	52 27 42	3103	53 54 12	3141	55 24 32	3101
	α Pegasi W.	36 10 26	3431	37 32 7	3355	38 55 15	3365	40 19 44	3391
	Aldebaran E.	47 1 14	3031	45 23 1	3013	43 44 24	3004	42 5 21	3076
	SATURN E.	74 31 55	9615	72 53 21	9596	71 14 23	9580	69 35 0	9561
17	SUN W.	128 2 55	3048	129 36 20	3039	131 10 10	3010	132 44 25	3009
	VENUS W.	81 3 9	3011	82 37 23	3030	84 12 4	3009	85 47 13	3048
	Fomalhaut W.	62 49 51	3094	64 21 40	3092	65 54 9	3099	67 27 17	3033
	α Pegasi W.	47 39 34	3009	40 10 35	3018	50 42 31	3077	52 15 19	3038
	Aldebaran E.	33 43 41	3402	32 2 2	3402	30 19 56	3444	28 37 24	3405
	SATURN E.	61 11 42	9470	59 29 46	9451	57 47 24	9439	56 4 35	9414
	Pollux E.	77 45 7	3506	76 5 25	3548	74 25 18	3530	72 44 47	3513
18	VENUS W.	93 49 48	3046	95 27 41	3036	97 6 1	3007	98 44 47	3008
	Fomalhaut W.	75 21 59	3079	76 58 36	3079	78 35 44	3057	80 13 22	3035
	α Pegasi W.	60 11 2	3079	61 48 19	3044	63 26 14	3016	65 4 47	3001
	SATURN E.	47 24 9	3337	45 38 49	3310	43 53 4	3294	42 6 56	3279
	Pollux E.	64 16 20	3439	62 33 31	3418	60 50 22	3404	59 6 53	3390
19	VENUS W.	107 5 1	3496	108 46 17	3480	110 27 56	3466	112 9 57	3450
	Fomalhaut W.	88 28 18	3544	90 8 30	3530	91 49 2	3515	93 29 54	3503
	α Pegasi W.	73 26 3	3475	75 7 51	3456	76 50 6	3437	78 32 48	3409
	α Arietis W.	30 8 8	3033	31 44 44	3038	33 22 47	3069	35 2 7	3033
	SATURN E.	33 10 47	3010	31 22 35	3199	29 34 6	3190	27 45 23	3189
	Pollux E.	50 25 3	3338	48 39 59	3331	46 54 44	3334	45 9 20	3390
	Regulus E.	85 50 34	3201	84 2 8	3186	82 13 20	3173	80 24 10	3158
20	Fomalhaut W.	101 58 5	3458	103 40 18	3453	105 22 37	3430	107 5 1	3448
	α Arietis W.	43 33 54	3350	45 18 40	3394	47 4 5	3300	48 50 5	3277
	Pollux E.	36 22 2	3338	34 36 58	3351	32 52 13	3360	31 7 54	3394
	Regulus E.	71 13 18	3096	69 22 13	3046	67 30 52	3076	65 39 16	3006
	MARS E.	91 37 26	3196	89 48 53	3186	88 0 4	3175	86 10 59	3165
	JUPITER E.	107 28 39	3118	105 38 8	3106	103 47 21	3098	101 56 19	3088
21	α Arietis W.	57 47 13	3197	59 35 45	3185	61 24 35	3175	63 13 40	3167
	Regulus E.	56 18 4	3039	54 25 19	3027	52 32 27	3023	50 39 29	3090
	MARS E.	77 2 15	3198	75 11 58	3192	73 21 33	3118	71 31 1	3115
	JUPITER E.	92 37 51	3059	90 45 38	3047	88 53 17	3043	87 0 49	3039
22	α Arietis W.	72 21 41	3143	74 11 36	3141	76 1 33	3140	77 51 31	3141
	Aldebaran W.	38 55 56	3008	40 49 18	3009	42 42 38	3010	44 35 56	3013
	Regulus E.	41 13 48	3016	39 20 38	3017	37 27 31	3020	35 34 28	3023
	MARS E.	62 17 21	3107	60 26 33	3109	58 35 47	3110	56 45 3	3113
	JUPITER E.	77 37 28	3039	75 44 44	3033	73 52 1	3035	71 59 21	3037
	Spica E.	94 47 55	3023	92 54 56	3024	91 1 59	3025	89 9 4	3027
23	α Arietis W.	87 0 37	3159	88 50 7	3165	90 39 28	3173	92 28 38	3180
	Aldebaran W.	54 1 7	3035	55 53 47	3043	57 46 16	3049	59 38 34	3057

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
23	MARS E.	54° 54' 23"	2116	53° 3' 48"	2120	51° 13' 19"	2124	49° 22' 57"	2130
	JUPITER E.	70 6 44	2040	68 14 12	2043	66 21 45	2048	64 29 25	2053
	Spica E.	87 16 12	2030	85 23 25	2035	83 30 45	2039	81 38 12	2044
24	Aldebaran W.	61 30 40	2065	63 22 33	2073	65 14 13	2083	67 5 39	2093
	SATURN W.	34 50 30	2072	36 42 13	2077	38 33 47	2085	40 25 10	2093
	MARS E.	40 13 36	2169	38 24 21	2178	36 35 20	2188	34 46 35	2200
	JUPITER E.	55 10 7	2088	53 18 50	2097	51 27 46	2106	49 36 56	2116
	Spica E.	72 17 52	2081	70 26 24	2090	68 35 10	2100	66 44 11	2111
25	Aldebaran W.	76 18 45	2149	78 8 30	2162	79 57 55	2174	81 47 1	2188
	SATURN W.	49 38 39	2149	51 28 34	2153	53 18 12	2166	55 7 31	2178
	Pollux W.	34 5 37	2401	35 49 10	2392	37 32 56	2387	39 16 50	2384
	JUPITER E.	40 26 48	2173	38 37 39	2184	36 48 48	2198	35 0 17	2210
	Spica E.	57 33 32	2170	55 44 20	2184	53 55 29	2198	52 6 59	2212
	Antares E.	103 17 31	2212	101 29 21	2224	99 41 29	2236	97 53 55	2248
	SUN E.	129 14 54	2489	127 33 26	2509	125 52 16	2515	124 11 23	2526
26	SATURN W.	64 9 16	2245	65 56 36	2259	67 43 36	2274	69 30 14	2288
	Pollux W.	47 56 15	2401	49 39 49	2408	51 23 13	2415	53 6 26	2424
	Spica E.	43 10 1	2291	41 23 48	2308	39 38 0	2326	37 52 38	2344
	Antares E.	89 0 56	2317	87 15 22	2339	85 30 9	2347	83 45 18	2363
	SUN E.	115 51 45	2599	114 12 49	2615	112 34 14	2630	110 56 0	2646
27	SATURN W.	78 18 4	2362	80 2 33	2377	81 46 41	2392	83 30 27	2408
	Pollux W.	61 38 59	2479	63 20 42	2491	65 2 8	2504	66 43 16	2516
	Regulus W.	24 52 56	2396	26 36 37	2408	28 20 0	2422	30 3 4	2436
	Antares E.	75 6 41	2443	73 24 6	2458	71 41 54	2475	70 0 6	2492
	SUN E.	102 50 8	2725	101 14 2	2742	99 38 18	2758	98 2 55	2774
28	SATURN W.	92 3 58	2482	93 45 37	2496	95 26 56	2510	97 7 55	2525
	Pollux W.	75 4 30	2582	76 43 50	2596	78 22 51	2609	80 1 34	2622
	Regulus W.	38 33 28	2506	40 14 33	2520	41 55 19	2533	43 35 46	2548
	Antares E.	61 36 55	2577	59 57 28	2593	58 18 24	2611	56 39 44	2629
	SUN E.	90 11 16	2854	88 37 58	2870	87 5 1	2886	85 32 24	2901
29	Regulus W.	51 53 14	2615	53 31 48	2626	55 10 5	2641	56 48 4	2654
	MARS W.	28 56 2	2722	30 32 13	2733	32 8 9	2744	33 43 51	2755
	Antares E.	48 32 31	2721	46 56 19	2741	45 20 33	2760	43 45 13	2780
	SUN E.	77 54 11	2977	76 23 29	2991	74 53 5	3005	73 22 59	3020
30	Regulus W.	64 53 50	2713	66 30 12	2726	68 6 18	2736	69 42 10	2747
	MARS W.	41 38 34	2812	43 12 46	2823	44 46 44	2833	46 20 29	2843
	JUPITER W.	27 52 10	2722	29 28 8	2743	31 3 51	2754	32 39 19	2765
	Antares E.	35 55 32	2997	34 23 9	2994	32 51 20	2954	31 20 9	2966
	SUN E.	65 56 47	3087	64 28 22	3101	63 0 13	3113	61 32 19	3125
31	Regulus W.	77 37 55	2799	79 12 24	2808	80 46 41	2818	82 20 45	2828
	MARS W.	54 5 55	2894	55 38 22	2902	57 10 38	2912	58 42 42	2921
	JUPITER W.	40 33 8	2816	42 7 15	2826	43 41 9	2836	45 14 50	2845
	Spica W.	24 25 57	2880	25 58 41	2881	27 31 24	2883	29 4 4	2887
	SUN E.	54 16 30	3185	52 50 3	3196	51 23 49	3208	49 57 49	3219

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Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
23	MARS	E.	47 32 44	9136	45 42 40	9143	43 52 47	9151	42 3 5	9159
	JUPITER	E.	62 37 14	9059	60 45 12	9065	58 53 19	9079	57 1 37	9080
	Spica	E.	79 45 47	9051	77 53 32	9057	76 1 27	9064	74 9 33	9073
24	Aldebaran	W.	68 56 49	9103	70 47 43	9114	72 38 21	9125	74 28 42	9137
	SATURN	W.	42 16 20	9101	44 7 17	9111	45 58 0	9120	47 48 28	9132
	MARS	E.	32 58 7	9019	31 9 57	9024	29 22 5	9037	27 34 33	9052
	JUPITER	E.	47 46 22	9126	45 56 3	9137	44 6 1	9149	42 16 16	9160
	Spica	E.	64 53 29	9122	63 3 3	9133	61 12 54	9145	59 23 3	9158
25	Aldebaran	W.	83 35 47	9201	85 24 13	9215	87 12 18	9229	89 0 3	9243
	SATURN	W.	56 56 31	9191	58 45 12	9204	60 33 34	9218	62 21 35	9231
	Pollux	W.	41 0 47	9384	42 44 45	9385	44 28 41	9399	46 12 32	9394
	JUPITER	E.	33 12 5	9294	31 24 13	9308	29 36 42	9321	27 49 31	9336
	Spica	E.	50 18 50	9287	48 31 3	9293	46 43 39	9298	44 56 38	9274
	Antares	E.	96 6 39	9282	94 19 43	9275	92 33 7	9269	90 46 51	9203
	SUN	E.	122 30 49	9542	120 50 34	9556	119 10 38	9580	117 31 2	9584
26	SATURN	W.	71 16 31	9309	73 2 27	9317	74 48 1	9333	76 33 13	9347
	Pollux	W.	54 49 26	9434	56 32 12	9445	58 14 43	9455	59 56 59	9467
	Spica	E.	36 7 42	9369	34 23 13	9362	32 39 12	9402	30 55 40	9423
	Antares	E.	82 0 50	9378	80 16 44	9394	78 33 0	9410	76 49 39	9426
	SUN	E.	109 18 7	9661	107 40 35	9678	106 3 25	9683	104 26 36	9709
27	SATURN	W.	85 13 51	9422	86 56 54	9436	88 39 37	9452	90 21 58	9467
	Pollux	W.	68 24 7	9529	70 4 40	9542	71 44 55	9555	73 24 52	9569
	Regulus	W.	31 45 48	9449	33 28 13	9463	35 10 18	9477	36 52 3	9482
	Antares	E.	68 18 41	9508	66 37 39	9525	64 57 1	9542	63 16 46	9559
	SUN	E.	96 27 53	9791	94 53 13	9806	93 18 53	9822	91 44 54	9838
28	SATURN	W.	98 48 34	9538	100 28 54	9553	102 8 54	9567	103 48 34	9581
	Pollux	W.	81 39 59	9635	83 18 6	9649	84 55 54	9663	86 33 24	9676
	Regulus	W.	45 15 53	9561	46 55 41	9575	48 35 10	9588	50 14 21	9601
	Antares	E.	55 1 29	9647	53 23 38	9665	51 46 11	9684	50 9 9	9701
	SUN	E.	84 0 7	9916	82 28 9	9932	80 56 31	9947	79 25 12	9962
29	Regulus	W.	58 25 46	9686	60 3 11	9678	61 40 20	9690	63 17 13	9702
	MARS	W.	35 19 18	9767	36 54 29	9779	38 29 25	9789	40 4 7	9801
	Antares	E.	42 10 19	9801	40 35 53	9824	39 1 56	9846	37 28 28	9871
	SUN	E.	71 53 11	3034	70 23 40	3047	68 54 26	3060	67 25 28	3074
30	Regulus	W.	71 17 47	9759	72 53 9	9769	74 28 18	9779	76 3 13	9789
	MARS	W.	47 54 1	9854	49 27 19	9864	51 0 24	9874	52 33 16	9884
	JUPITER	W.	34 14 33	9776	35 49 32	9787	37 24 17	9797	38 58 49	9807
	Antares	E.	29 49 39	3022	28 19 53	3030	26 50 55	3105	25 22 52	3157
	SUN	E.	60 4 40	3138	58 37 16	3149	57 10 6	3162	55 43 11	3173
31	Regulus	W.	83 54 37	9837	85 28 17	9845	87 1 46	9854	88 35 4	9862
	MARS	W.	60 14 34	9930	61 46 15	9938	63 17 46	9946	64 49 6	9954
	JUPITER	W.	46 48 19	9854	48 21 37	9862	49 54 44	9873	51 27 39	9880
	Spica	W.	30 36 40	9891	32 9 11	9894	33 41 37	9898	35 13 58	9903
	SUN	E.	48 32 2	3230	47 6 28	3240	45 41 6	3251	44 15 57	3262

GREENWICH MEAN TIME.										
JANUARY.						FEBRUARY.				
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> ' "	"	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> ' "	"
1	19 12 22.92	-13.041	-20 17 32.8	+21.85	0 27.0	1	19 20 49.58	+13.327	-22 2 52.9	+ 3.22
2	19 6 57.98	13.966	20 9 33.0	18.13	0 17.7	2	19 26 12.83	13.607	22 1 2.0	6.03
3	19 1 16.07	14.447	20 3 2.3	14.43	0 8.1	3	19 31 42.51	13.882	21 58 3.1	8.90
4	18 55 28.19	14.484	19 58 0.1	10.78	23 48.9	4	19 37 18.04	14.065	21 53 54.4	11.84
5	18 49 45.36	14.038	19 54 25.4	7.12	23 39.5	5	19 42 58.94	14.309	21 48 34.6	14.88
6	18 44 17.89	-13.194	-19 52 18.0	+ 3.50	23 30.5	6	19 48 44.75	+14.504	-21 42 2.5	+17.86
7	18 39 14.71	12.023	19 51 36.8	- 0.06	23 22.1	7	19 54 35.03	14.684	21 34 16.9	20.94
8	18 34 42.94	10.580	19 52 20.0	3.52	23 14.3	8	20 0 29.48	14.849	21 25 17.0	24.06
9	18 30 47.79	8.284	19 54 24.4	6.82	23 7.1	9	20 6 27.74	15.001	21 15 1.9	27.21
10	18 27 32.53	7.278	19 57 45.8	9.91	23 0.6	10	20 12 29.49	15.140	21 3 30.9	30.38
11	18 24 58.75	- 5.536	-20 2 17.9	-12.71	22 54.8	11	20 18 34.41	+15.268	-20 50 43.2	+23.59
12	18 23 6.61	3.814	20 7 53.1	15.16	22 49.7	12	20 24 42.27	15.386	20 36 38.3	26.82
13	18 21 55.23	2.147	20 14 22.8	17.24	22 45.2	13	20 30 52.88	15.485	20 21 15.6	40.07
14	18 21 22.93	- 0.561	20 21 37.5	18.22	22 41.3	14	20 37 6.01	15.566	20 4 34.7	43.34
15	18 21 27.53	+ 0.227	20 29 27.3	20.17	22 37.9	15	20 43 21.46	15.620	19 46 35.3	46.62
16	18 22 6.58	+ 2.309	-20 37 42.1	-21.01	22 35.2	16	20 49 30.08	+15.778	-19 27 16.9	+49.22
17	18 23 17.49	3.583	20 46 12.4	21.45	22 32.9	17	20 55 58.75	15.860	19 6 39.3	53.22
18	18 24 57.67	4.749	20 54 48.8	21.52	22 31.0	18	21 2 20.32	15.937	18 44 42.1	56.54
19	18 27 4.63	5.815	21 3 22.5	21.53	22 29.6	19	21 8 43.70	16.016	18 21 25.2	59.87
20	18 29 35.99	6.783	21 11 45.3	20.02	22 28.5	20	21 15 8.79	16.080	17 56 48.4	63.20
21	18 32 29.52	+ 7.604	-21 19 49.9	-19.72	22 27.8	21	21 21 35.53	+16.147	-17 30 51.5	+66.54
22	18 35 43.18	8.482	21 27 29.3	18.53	22 27.3	22	21 28 3.83	16.212	17 3 34.3	69.88
23	18 39 15.08	9.185	21 34 37.3	17.10	22 27.2	23	21 34 33.66	16.275	16 34 57.0	73.23
24	18 43 3.52	9.841	21 41 8.5	15.46	22 27.3	24	21 41 5.00	16.337	16 4 50.3	76.58
25	18 47 6.95	10.426	21 46 57.9	13.02	22 27.6	25	21 47 37.83	16.399	15 33 41.2	79.93
26	18 51 24.00	+10.976	-21 52 0.9	-11.61	22 28.1	26	21 54 12.14	+16.461	-15 1 2.7	+83.28
27	18 55 53.40	11.466	21 56 13.8	9.44	22 28.8	27	22 0 47.94	16.523	14 27 4.0	86.62
28	19 0 34.01	11.911	21 59 32.8	7.12	22 29.8	28	22 7 25.24	16.586	13 51 45.2	89.95
29	19 5 24.79	12.316	22 1 54.8	4.69	22 30.8	29	22 14 4.07	16.650	13 15 6.4	93.28
30	19 10 24.85	12.684	22 3 17.2	- 2.15	22 32.0	30	22 20 44.47	16.716	12 37 8.0	96.59
31	19 15 33.37	+13.020	-22 3 37.3	+ 0.49	22 33.3	31	22 27 26.49	+16.785	-11 57 50.2	+99.89
32	19 20 49.58	+13.327	-22 2 52.9	+ 3.22	22 34.7	32	22 34 10.17	+16.856	-11 17 13.5	+103.16
Day of the Month.						Day of the Month.				
Semidiameter . .						Semidiameter . . . . .				
Hor. Parallax . .						Horizontal Parallax . . .				
1st.	4.9	4.9	4.6	4.1	3.7	5th.	2.9	2.7	2.6	2.5
6th.	13.1	12.1	10.9	9.7	8.8	10th.	7.7	7.3	7.0	6.8
11th.						15th.				
16th.						20th.				
21st.						25th.				
26th.										
31st.										

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.									
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.				
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.					
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m				
1	22 14 4.07	+16.650	-13 15 6.4	+ 99.98	23 38.9	1	1 45 58.35	+14.344	+12 45 54.7	+109.61	1 6.0				
2	22 20 44.47	16.716	12 37 8.0	96.59	23 41.7	2	1 51 35.02	13.703	13 28 32.6	103.48	1 7.7				
3	22 27 26.49	16.785	11 57 50.2	99.89	23 44.5	3	1 56 55 69	13.011	14 8 39.0	97.00	1 9.1				
4	22 34 10.17	16.856	11 17 13.5	103.16	23 47.3	4	2 1 59.19	12.973	14 46 5.9	90.30	1 10.2				
5	22 40 55.55	16.928	10 35 18.5	106.41	23 50.2	5	2 6 44.44	11.499	15 20 46.4	83.14	1 11.0				
6	22 47 42.69	+17.002	- 9 52 6.0	+109.02	23 53.1	6	2 11 10.42	+10.698	+15 52 34.6	+ 75.85	1 11.4				
7	22 54 31.64	17.079	9 7 36.8	112.60	23 56.0	7	2 15 16.24	9.810	16 21 25.8	68.38	1 11.6				
8	23 1 22.48	17.157	8 21 52.1	115.99	23 58.9	8	2 19 1.06	8.990	16 47 15.7	60.76	1 11.4				
9	23 8 15.90	17.237	7 34 53.3	118.96		9	2 22 24.20	8.004	17 10 1.3	53.02	1 10.8				
10	23 15 9.86	17.318	6 46 42.4	121.94	0 1.9	10	2 25 25.06	7.064	17 29 39.6	45.16	1 9.8				
11	23 22 6.47	+17.398	- 5 57 21.1	+124.82	0 4.9	11	2 28 3.12	+ 6.105	+17 46 8.3	+ 37.22	1 8.5				
12	23 29 4.99	17.478	5 6 52.1	127.58	0 7.9	12	2 30 18.00	5.134	17 59 25.6	29.21	1 6.8				
13	23 36 5.44	17.556	4 15 18.2	130.91	0 11.0	13	2 32 9.49	4.156	18 9 30.2	21.16	1 4.7				
14	23 43 7.66	17.639	3 22 43.3	132.67	0 14.1	14	2 33 37.47	3.177	18 16 21.3	13.09	1 2.2				
15	23 50 11.60	17.697	2 29 11.4	134.95	0 17.2	15	2 34 42.05	2.906	18 19 58.6	+ 5.02	0 50.3				
16	23 57 17.05	+17.755	- 1 34 47.6	+136.99	0 20.4	16	2 35 23.40	+ 1.951	+18 20 22.4	- 3.02	0 56.0				
17	0 4 23.78	17.802	- 0 39 37.8	138.78	0 23.6	17	2 35 42.28	+ 0.390	18 17 34.2	10.97	0 52.4				
18	0 11 31.44	17.834	+ 0 16 11.2	140.96	0 26.8	18	2 35 39.12	- 0.576	18 11 36.8	18.79	0 48.4				
19	0 18 39.64	17.846	1 12 31.8	141.40	0 30.0	19	2 35 14.98	1.427	18 2 34.0	26.41	0 44.1				
20	0 25 47.87	17.836	2 9 15.3	142.15	0 33.2	20	2 34 31.08	2.222	17 50 31.4	33.75	0 39.4				
21	0 32 55.52	+17.797	+ 3 6 11.4	+142.45	0 36.4	21	2 33 28.88	- 2.949	+17 35 36.8	- 40.73	0 34.4				
22	0 40 1.86	17.736	4 3 9.3	142.99	0 39.5	22	2 32 10.14	3.606	17 17 59.8	47.96	0 29.2				
23	0 47 6.06	17.617	4 59 57.1	141.00	0 42.6	23	2 30 36.79	4.164	16 57 52.6	53.23	0 23.8				
24	0 54 7.14	17.465	5 56 22.0	140.37	0 45.7	24	2 28 51.05	4.631	16 35 29.8	58.55	0 18.1				
25	1 1 4.03	17.267	6 52 10.2	138.55	0 48.7	25	2 26 55.30	4.998	16 11 8.1	63.12	0 12.2				
26	1 7 55.57	+17.018	+ 7 47 7.7	+136.14	0 51.6	26	2 24 52.02	- 5.258	+15 45 6.6	- 66.85	0 6.2				
27	1 14 40.49	16.715	8 41 0.0	133.12	0 54.4	27	2 22 43.82	5.407	15 17 46.3	69.68	0 0.2				
28	1 21 17.45	16.355	9 33 32.7	129.50	0 57.1	28	2 20 33.34	5.448	14 49 29.6	71.55	23 48.0				
29	1 27 45.09	15.936	10 24 31.5	125.30	0 59.6	29	2 18 23.16	5.383	14 20 39.8	72.43	23 42.0				
30	1 34 2.04	15.464	11 13 43.0	120.57	1 2.0	30	2 16 15.77	5.217	13 51 40.6	72.34	23 36.0				
31	1 40 6.92	+14.939	+12 0 54.7	+115.30	1 4.1	31	2 14 13.50	- 4.956	+13 22 55.4	- 71.37	23 30.2				
32	1 45 58.35	+14.344	+12 45 54.7	+109.61	1 6.0	32	2 12 18.55	- 4.609	+12 54 47.0	- 69.28	23 24.5				
Day of the Month.		3d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.		1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . . .		2.5	2.4	2.5	2.5	2.6	2.8	Semidiameter . .		3.2	3.6	4.3	4.8	5.4	5.8
Horizontal Parallax		6.5	6.5	6.5	6.7	7.0	7.6	Hor. Parallax . .		8.4	9.6	11.1	12.8	14.4	15.5

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m			
1	2 14 13.50	- 4.956	+13 22 55.4	-71.27	23 30.2	1	3 4 3.04	+12.700	+14 12 15.8	+69.92	22 24.7			
2	2 12 18.55	4.609	12 54 47.0	69.28	23 24.5	2	3 9 13.94	13.208	14 40 38.1	71.91	22 26.1			
3	2 10 32.88	4.185	12 27 36.5	66.45	23 19.0	3	3 14 37.08	13.720	15 9 45.3	73.66	22 27.7			
4	2 8 58.20	3.685	12 1 43.6	62.84	23 13.7	4	3 20 12.53	14.236	15 39 30.9	75.11	22 29.5			
5	2 7 35.94	3.151	11 37 25.4	58.57	23 8.6	5	3 26 0.44	14.759	16 9 48.5	76.32	22 31.6			
6	2 6 27.30	- 2.569	+11 14 56.7	-53.73	23 3.8	6	3 32 1.02	+15.290	+16 40 31.8	+77.94	22 33.9			
7	2 5 33.23	1.936	10 54 30.0	48.42	22 59.2	7	3 38 14.42	15.898	17 11 33.4	77.85	22 36.4			
8	2 4 54.48	1.288	10 36 15.2	42.75	22 54.9	8	3 44 40.82	16.373	17 42 46.0	78.15	22 39.1			
9	2 4 31.54	- 0.622	10 20 20.0	36.81	22 50.8	9	3 51 20.39	16.925	18 14 1.7	78.11	22 42.0			
10	2 4 24.71	+ 0.054	10 6 49.7	30.70	22 47.0	10	3 58 13.31	17.484	18 45 12.4	77.72	22 45.2			
11	2 4 34.17	+ 0.734	+ 9 55 47.4	-24.48	22 43.5	11	4 5 19.68	+18.048	+19 16 9.0	+76.94	22 48.6			
12	2 4 59.92	1.412	9 47 14.8	18.23	22 40.3	12	4 12 39.65	18.615	19 46 42.1	75.75	22 52.3			
13	2 5 41.88	2.083	9 41 12.1	12.01	22 37.3	13	4 20 13.21	19.189	20 16 41.7	74.14	22 56.0			
14	2 6 30.84	2.746	9 37 37.5	- 5.88	22 34.5	14	4 28 0.33	19.745	20 45 57.3	72.07	23 0.1			
15	2 7 53.58	3.397	9 36 28.7	+ 0.13	22 32.0	15	4 36 0.90	20.301	21 14 17.4	69.53	23 4.4			
16	2 9 22.78	+ 4.034	+ 9 37 42.6	+ 6.00	22 29.8	16	4 44 14.65	+20.848	+21 41 30.7	+66.50	23 8.9			
17	2 11 7.10	4.657	9 41 15.1	11.68	22 27.9	17	4 52 41.16	21.365	22 7 25.3	62.97	23 13.6			
18	2 13 6.20	5.265	9 47 1.8	17.17	22 26.2	18	5 1 19.91	21.860	22 31 48.9	58.92	23 18.5			
19	2 15 19.73	5.890	9 54 57.6	22.44	22 24.7	19	5 10 10.17	22.322	22 54 29.3	54.36	23 23.6			
20	2 17 47.35	6.439	10 4 57.2	27.49	22 23.4	20	5 19 11.03	22.742	23 15 14.4	49.32	23 28.9			
21	2 20 28.71	+ 7.005	+10 16 55.5	+22.32	22 22.3	21	5 28 21.41	+23.114	+23 33 53.0	+43.82	23 34.2			
22	2 23 23.51	7.559	10 30 46.6	36.91	22 21.5	22	5 37 40.07	23.431	23 50 14.2	37.89	23 39.7			
23	2 26 31.44	8.101	10 46 25.2	41.27	22 20.9	23	5 47 5.59	23.685	24 4 8.8	31.60	23 45.3			
24	2 29 52.28	8.633	11 3 45.5	45.39	22 20.5	24	5 56 36.44	23.874	24 15 28.5	24.99	23 51.0			
25	2 33 25.77	9.156	11 22 42.0	49.26	22 20.3	25	6 6 10.98	23.995	24 24 6.5	18.15	23 56.7			
26	2 37 11.72	+ 9.672	+11 43 8.9	+52.93	22 20.3	26	6 15 47.56	+24.043	+24 29 58.5	+11.16				
27	2 41 10.00	10.189	12 5 0.7	56.35	22 20.6	27	6 25 24.46	24.091	24 33 1.6	+ 4.09	0 2.4			
28	2 45 20.45	10.688	12 28 11.7	59.53	22 21.0	28	6 35 0.01	23.931	24 33 15.0	- 9.97	0 8.0			
29	2 49 43.01	11.192	12 52 36.4	62.48	22 21.6	29	6 44 32.65	23.778	24 30 39.7	9.96	0 13.7			
30	2 54 17.63	11.694	13 18 9.1	65.20	22 22.4	30	6 54 0.90	23.566	24 25 18.2	16.81	0 19.2			
31	2 59 4.30	+12.196	+13 44 44.1	+67.68	22 23.5	31	7 3 23.41	+23.302	+24 17 14.6	-23.45	0 24.7			
32	3 4 3.04	+12.700	+14 12 15.8	+69.92	22 24.7	32	7 12 39.00	+22.990	+24 6 34.6	-29.84	0 30.0			
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter . .	6.0	5.8	5.4	4.9	4.4	4.0	3.6	Semidiameter . .	3.3	3.0	2.8	2.6	2.5	2.5
Hor. Parallax . .	15.8	15.3	14.2	13.0	11.7	10.6	9.5	Hor. Parallax . .	8.7	7.9	7.3	6.9	6.7	6.7

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	7 3 23.41	+23.302	+24 17 14.6	-23.45	0 24.7	1	10 30 46.73	+10.228	+ 8 33 59.3	-88.27	1 49.7
2	7 12 39.00	22.990	24 6 34.6	22.84	0 30.0	2	10 34 47.20	9.811	7 58 56.9	86.90	1 49.8
3	7 21 46.62	22.639	23 53 24.6	35.95	0 35.2	3	10 38 37.59	9.386	7 24 29.6	85.34	1 49.7
4	7 30 45.39	22.254	23 37 51.7	41.74	0 40.3	4	10 42 17.65	8.951	6 50 42.5	83.56	1 49.4
5	7 39 34.60	21.843	23 20 4.0	47.18	0 45.2	5	10 45 47.13	8.503	6 17 40.5	81.58	1 48.9
6	7 48 13.69	+21.411	+23 0 9.6	-52.29	0 49.9	6	10 49 5.70	+ 8.042	+ 5 45 28.7	-79.37	1 48.3
7	7 56 42.20	20.963	22 38 16.9	57.04	0 54.4	7	10 52 13.02	7.566	5 14 12.8	76.92	1 47.4
8	8 4 59.81	20.504	22 14 34.3	61.45	0 58.8	8	10 55 8.68	7.071	4 43 58.5	74.23	1 46.4
9	8 13 6.35	20.038	21 49 10.1	65.50	1 2.9	9	10 57 52.25	6.556	4 14 51.9	71.27	1 45.2
10	8 21 1.61	19.568	21 22 12.8	69.22	1 6.9	10	11 0 23.21	6.090	3 46 50.8	68.03	1 43.8
11	8 28 45.60	+19.098	+20 53 50.1	-72.62	1 10.7	11	11 2 41.01	+ 5.459	+ 3 20 29.0	-64.49	1 42.1
12	8 36 18.33	18.630	20 24 9.7	75.70	1 14.3	12	11 4 45.05	4.874	2 55 28.8	60.63	1 40.2
13	8 43 39.84	18.164	19 53 19.0	78.48	1 17.7	13	11 6 34.73	4.261	2 32 1.5	56.42	1 38.1
14	8 50 50.22	17.702	19 21 25.0	80.98	1 20.9	14	11 8 9.35	3.690	2 10 21.3	51.86	1 35.7
15	8 57 49.60	17.247	18 48 34.5	83.19	1 24.0	15	11 9 28.24	2.949	1 50 35.2	46.91	1 33.0
16	9 4 38.14	+16.798	+18 14 53.8	-85.15	1 26.8	16	11 10 30.67	+ 2.948	+ 1 32 52.7	-41.56	1 30.1
17	9 11 15.97	16.356	17 40 29.1	86.87	1 29.5	17	11 11 15.93	1.518	1 17 23.7	35.79	1 26.9
18	9 17 43.27	15.920	17 5 26.2	88.34	1 32.0	18	11 11 43.28	+ 0.758	1 4 18.3	29.58	1 23.5
19	9 24 0.18	15.483	16 29 50.6	89.59	1 34.4	19	11 11 52.08	- 0.028	0 53 47.2	22.93	1 19.7
20	9 30 6.87	15.068	15 53 47.6	90.02	1 36.5	20	11 11 41.73	0.838	0 46 1.1	15.83	1 15.6
21	9 36 3.48	+14.651	+15 17 22.3	-91.45	1 38.5	21	11 11 11.74	- 1.664	+ 0 41 10.6	- 8.30	1 11.1
22	9 41 50.16	14.240	14 40 39.7	92.07	1 40.3	22	11 10 21.76	2.502	0 39 25.7	- 0.36	1 6.3
23	9 47 27.03	13.833	14 3 44.3	92.51	1 41.9	23	11 9 11.65	3.240	0 40 55.0	+ 7.89	1 1.2
24	9 52 54.18	13.420	13 26 40.8	92.75	1 43.3	24	11 7 41.53	4.167	0 45 46.8	16.47	0 55.8
25	9 58 11.69	13.030	12 49 33.6	92.82	1 44.7	25	11 5 51.82	4.970	0 54 7.1	25.25	0 50.0
26	10 3 19.65	+12.633	+12 12 27.0	-92.70	1 45.9	26	11 3 43.30	- 5.731	+ 1 5 59.1	+34.09	0 43.9
27	10 8 18.08	12.226	11 35 25.4	92.41	1 46.9	27	11 1 17.23	6.430	1 21 22.7	42.85	0 37.6
28	10 13 6.99	11.840	10 58 32.9	91.94	1 47.8	28	10 58 35.33	7.047	1 40 13.7	51.35	0 31.0
29	10 17 46.37	11.442	10 21 53.7	91.30	1 48.5	29	10 55 39.81	7.561	2 2 23.7	59.39	0 24.1
30	10 22 16.18	11.042	9 45 32.1	90.47	1 49.1	30	10 52 33.42	7.949	2 27 39.1	66.76	0 17.1
31	10 26 36.33	+10.637	+ 9 9 32.4	-89.46	1 49.5	31	10 49 19.40	- 8.192	+ 2 55 40.8	+73.21	0 10.0
32	10 30 46.73	+10.228	+ 8 33 59.3	-88.27	1 49.7	32	10 46 1.49	- 8.272	+ 3 26 4.3	+78.54	0 2.2
Day of the Month.						Day of the Month.					
5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th. 29th.					
Semidiameter . . 2.6 2.7 2.8 2.9 3.1 3.4						Semidiameter . . 3.7 4.0 4.3 4.7 5.1 5.3					
Hor. Parallax . . 6.8 7.0 7.4 7.8 8.3 9.0						Hor. Parallax . . 9.7 10.5 11.4 12.5 13.5 14.1					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			h m s	s	° ' "	"	
1	10 46 1.49	- 8.972	+ 3 26 4.3	+ 78.54	23 2.8	1	11 52 18.89	+16.123	+ 2 53 50.3	-106.72	23 13.2
2	10 49 43.78	8.173	3 58 20.3	82.55	23 48.4	2	11 58 46.34	16.150	2 10 41.2	108.25	23 15.8
3	10 39 30.67	7.888	4 31 55.1	85.09	23 41.4	3	12 5 14.29	16.165	1 26 44.4	110.71	23 18.3
4	10 36 26.68	7.412	5 6 12.0	86.04	23 34.7	4	12 11 42.09	16.150	+ 0 42 10.3	112.06	23 20.8
5	10 33 36.31	6.754	5 40 32.1	85.36	23 28.2	5	12 18 9.34	16.118	- 0 2 51.7	113.05	23 23.3
6	10 31 3.91	- 5.918	+ 6 14 16.4	+ 83.06	23 22.1	6	12 24 35.65	+16.072	- 0 48 13.2	-113.69	23 25.8
7	10 28 53.50	4.994	6 46 46.5	79.18	23 16.5	7	12 31 0.74	16.017	1 33 46.4	114.03	23 28.2
8	10 27 8.69	3.789	7 17 25.9	73.86	23 11.2	8	12 37 24.42	15.955	2 19 24.7	114.12	23 30.7
9	10 25 52.53	2.541	7 45 41.4	67.22	23 6.5	9	12 43 46.56	15.889	3 5 2.1	113.96	23 33.1
10	10 25 7.43	- 1.204	8 11 3.7	59.45	23 2.4	10	12 50 7.10	15.822	3 50 33.1	113.59	23 35.4
11	10 24 55.24	+ 0.194	+ 8 33 7.7	+ 50.74	22 58.8	11	12 56 26.03	+15.755	- 4 35 53.1	-113.04	23 37.8
12	10 25 17.04	1.686	8 51 32.9	41.23	22 55.8	12	13 2 43.37	15.690	5 20 57.8	112.32	23 40.1
13	10 26 13.37	3.067	9 6 3.0	31.18	22 53.3	13	13 8 59.17	15.627	6 5 43.3	111.45	23 42.4
14	10 27 44.11	4.490	9 16 26.5	20.72	22 51.4	14	13 15 13.48	15.567	6 50 6.5	110.46	23 44.7
15	10 29 48.57	5.874	9 22 35.8	+ 10.03	22 50.1	15	13 21 26.42	15.512	7 34 4.2	109.34	23 47.0
16	10 32 25.58	+ 7.199	+ 9 24 27.3	- 0.73	22 49.3	16	13 27 38.09	+15.462	- 8 17 33.7	-108.19	23 49.2
17	10 35 33.55	8.451	9 22 1.2	11.42	22 48.0	17	13 33 48.62	15.416	9 0 32.9	106.80	23 51.4
18	10 39 10.52	9.614	9 15 20.9	21.89	22 49.0	18	13 39 58.11	15.376	9 42 50.2	105.39	23 53.6
19	10 43 14.27	10.681	9 4 33.0	22.04	22 49.5	19	13 46 6.71	15.342	10 24 50.7	103.89	23 55.8
20	10 47 42.40	11.645	8 49 46.5	41.75	22 50.4	20	13 52 14.55	15.313	11 6 5.5	102.33	23 58.0
21	10 52 32.36	+12.501	+ 8 31 13.2	- 50.24	22 51.6	21	13 58 21.76	+15.229	-11 46 41.9	-100.69	
22	10 57 41.61	13.252	8 9 6.2	59.54	22 53.1	22	14 4 28.47	15.271	12 26 38.3	99.00	0 0.2
23	11 3 7.59	13.897	7 43 40.7	67.46	22 54.8	23	14 10 34.82	15.229	13 5 53.2	97.94	0 2.3
24	11 8 47.85	14.442	7 15 12.7	74.74	22 56.7	24	14 16 40.95	15.202	13 44 25.3	95.42	0 4.5
25	11 14 40.07	14.895	6 43 58.7	81.30	22 58.8	25	14 22 46.97	15.250	14 22 13.1	93.55	0 6.6
26	11 20 42.11	+15.922	+ 6 10 15.7	- 87.16	23 1.0	26	14 28 53.00	+15.253	-14 59 15.2	- 91.62	0 8.8
27	11 26 52.02	15.552	5 34 20.4	92.33	23 3.4	27	14 34 59.16	15.261	15 35 30.3	89.63	0 11.0
28	11 33 8.07	15.775	4 56 20.1	96.84	23 5.8	28	14 41 5.56	15.272	16 10 57.2	87.00	0 13.1
29	11 39 28.74	15.938	4 16 57.3	100.71	23 8.2	29	14 47 12.27	15.298	16 45 34.7	85.51	0 15.3
30	11 45 52.71	16.052	3 35 59.9	103.98	23 10.7	30	14 53 19.41	15.307	17 19 21.4	83.37	0 17.5
31	11 52 18.89	+16.123	+ 2 53 50.3	-106.72	23 13.2	31	14 59 27.03	+15.322	-17 52 16.2	- 81.18	0 19.7
32	11 58 46.34	+16.150	+ 2 10 41.2	-106.25	23 15.8	32	15 5 35.23	+15.354	-18 24 17.8	- 78.94	0 21.9
Day of the Month.						Day of the Month.					
Semidiameter . .						Semidiameter . .					
Hor. Parallax . .						Hor. Parallax . .					
2d. 5.2						2d. 2.6					
3d. 4.8						3d. 2.5					
4th. 4.2						4th. 2.4					
5th. 3.6						5th. 2.3					
6th. 3.1						6th. 2.3					
7th. 2.8						7th. 2.3					
8th. 2.4						8th. 2.3					
9th. 2.3						9th. 2.3					
10th. 2.3						10th. 2.3					
11th. 2.3						11th. 2.3					
12th. 2.3						12th. 2.3					
13th. 2.3						13th. 2.3					
14th. 2.3						14th. 2.3					
15th. 2.3						15th. 2.3					
16th. 2.3						16th. 2.3					
17th. 2.3						17th. 2.3					
18th. 2.3						18th. 2.3					
19th. 2.3						19th. 2.3					
20th. 2.3						20th. 2.3					
21st. 2.3						21st. 2.3					
22d. 2.3						22d. 2.3					
23d. 2.3						23d. 2.3					
24th. 2.3						24th. 2.3					
25th. 2.3						25th. 2.3					
26th. 2.3						26th. 2.3					
27th. 2.3						27th. 2.3					
28th. 2.3						28th. 2.3					
29th. 2.3						29th. 2.3					
30th. 2.3						30th. 2.3					
31st. 2.3						31st. 2.3					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.



GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	15 5 35.23	+15.354	-18 24 17.8	-78.94	0 21.9	1	18 3 17.07	+10.867	-25 39 21.6	+13.81	1 21.3
2	15 11 44.03	15.361	18 55 24.9	76.64	0 24.1	2	18 7 28.35	10.034	25 33 9.0	17.99	1 21.5
3	15 17 53.50	15.408	19 25 36.2	74.99	0 26.3	3	18 11 17.72	9.080	25 25 35.5	90.55	1 21.4
4	15 24 3.65	15.438	19 54 50.5	71.88	0 28.5	4	18 14 42.18	7.955	25 16 43.7	93.75	1 20.8
5	15 30 14.51	15.467	20 23 6.2	69.42	0 30.8	5	18 17 38.45	6.710	25 6 36.6	96.89	1 19.8
6	15 36 26.05	+15.485	-20 50 22.2	-66.90	0 33.0	6	18 20 3.06	+5.515	-24 55 17.5	+99.74	1 18.2
7	15 42 38.26	15.522	21 16 37.0	64.39	0 35.3	7	18 21 52.35	3.766	24 42 50.3	32.49	1 16.1
8	15 48 51.09	15.547	21 41 49.3	61.69	0 37.6	8	18 23 2.63	2.065	24 29 19.2	35.67	1 13.3
9	15 55 4.48	15.568	22 5 57.7	58.99	0 39.9	9	18 23 30.32	+0.290	24 14 48.2	37.48	1 9.8
10	16 1 18.32	15.585	22 29 0.5	56.23	0 42.2	10	18 23 12.23	-1.747	23 59 91.4	39.79	1 5.5
11	16 7 32.50	+15.596	-22 50 56.2	-53.41	0 44.4	11	18 22 5.79	-3.899	-23 43 3.2	+41.78	1 0.4
12	16 13 46.88	15.601	23 11 43.7	50.53	0 46.7	12	18 20 9.47	5.894	23 25 57.8	43.64	0 54.5
13	16 20 1.28	15.598	23 31 21.1	47.58	0 49.0	13	18 17 23.17	7.954	23 8 10.1	45.99	0 47.8
14	16 26 15.48	15.584	23 49 47.1	44.57	0 51.3	14	18 13 48.63	9.896	22 49 46.0	46.66	0 40.3
15	16 32 29.23	15.559	24 7 0.1	41.50	0 53.6	15	18 9 29.73	11.633	22 30 53.3	47.65	0 32.1
16	16 38 42.23	+15.521	-24 22 58.6	-38.36	0 55.9	16	18 4 32.08	-13.000	-22 11 43.0	+48.10	0 23.2
17	16 44 54.11	15.466	24 37 41.0	35.16	0 58.2	17	17 59 5.97	14.093	21 52 29.9	47.66	0 13.9
18	16 51 4.47	15.394	24 51 5.7	31.90	1 0.4	18	17 53 19.90	14.664	21 33 32.9	46.79	0 4.5
19	16 57 12.85	15.300	25 3 11.7	28.58	1 2.6	19	17 47 25.98	14.744	21 15 15.4	44.55	23 44.8
20	17 3 18.69	15.189	25 13 57.2	25.90	1 4.7	20	17 41 36.07	14.335	20 58 2.9	41.30	23 35.3
21	17 9 21.30	+15.037	-25 23 21.0	-21.77	1 6.8	21	17 36 1.44	-13.480	-20 42 21.6	+36.97	23 26.2
22	17 15 20.23	14.860	25 31 21.9	18.29	1 8.9	22	17 30 52.02	12.948	20 28 35.7	31.70	23 17.7
23	17 21 14.40	14.648	25 37 58.8	14.77	1 10.9	23	17 26 15.81	10.799	20 17 5.4	25.76	23 9.9
24	17 27 2.90	14.393	25 43 10.6	11.91	1 12.7	24	17 22 18.64	9.019	20 8 4.4	19.30	23 2.7
25	17 32 44.91	14.099	25 46 56.8	7.63	1 14.5	25	17 19 4.15	7.185	20 1 40.4	12.70	22 56.2
26	17 38 18.98	+13.738	-25 49 16.7	-4.03	1 16.1	26	17 16 34.04	-5.325	-19 57 53.9	+6.90	22 50.5
27	17 43 43.84	13.323	25 50 10.0	-0.42	1 17.6	27	17 14 48.39	3.488	19 56 40.2	+0.01	22 45.5
28	17 48 57.93	12.840	25 49 36.6	+3.30	1 18.8	28	17 13 46.09	1.719	19 57 49.6	-5.70	22 41.2
29	17 53 59.53	12.290	25 47 36.8	6.78	1 19.9	29	17 13 25.10	-0.048	20 1 9.4	10.84	22 37.6
30	17 58 46.05	11.639	25 44 11.5	10.39	1 20.7	30	17 13 42.90	+1.511	20 6 24.7	15.39	22 34.5
31	18 3 17.07	+10.867	-25 39 21.6	+13.81	1 21.3	31	17 14 36.64	+2.947	-20 13 19.4	-19.13	22 31.9
32	18 7 28.35	+10.034	-25 33 9.0	+17.99	1 21.5	32	17 16 3.38	+4.961	-20 21 37.5	-22.96	22 29.9
Day of the Month.						Day of the Month.					
2d.						2d.					
7th.						7th.					
12th.						12th.					
17th.						17th.					
22d.						22d.					
27th.						27th.					
32d.						32d.					
Semidiameter . .						Semidiameter . .					
Hor. Parallax . .						Hor. Parallax . .					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	16 40 0.37	+13.081	-20 51 52.2	-31.01	21 56.0	1	10 26 12.29	+13.363	-22 2 20.9	+20.00	22 40.1
2	16 45 14.79	13.121	21 3 58.7	29.53	21 57.3	2	19 31 32.67	13.326	21 53 44.3	22.35	22 41.5
3	16 50 30.16	13.159	21 15 29.4	28.03	21 58.6	3	19 36 52.40	13.307	21 44 28.1	23.00	22 42.9
4	16 55 46.45	13.196	21 26 23.8	26.50	21 59.9	4	19 42 11.43	13.277	21 34 32.6	25.02	22 44.2
5	17 1 3.61	13.239	21 36 41.3	24.95	22 1.3	5	19 47 29.71	13.245	21 23 58.2	27.23	22 45.6
6	17 6 21.61	+13.266	-21 46 21.4	-23.38	22 2.7	6	19 52 47.20	+13.212	-21 12 45.3	+26.83	22 46.9
7	17 11 40.41	13.298	21 55 23.5	21.79	22 4.1	7	19 58 3.87	13.177	21 0 54.4	30.41	22 48.2
8	17 16 59.96	13.326	22 3 47.3	20.18	22 5.5	8	20 3 19.67	13.140	20 48 25.8	31.97	22 49.5
9	17 22 20.20	13.357	22 11 32.4	18.56	22 6.9	9	20 8 34.57	13.102	20 35 20.1	33.51	22 50.8
10	17 27 41.39	13.384	22 18 38.3	16.22	22 8.3	10	20 13 48.55	13.062	20 21 37.8	35.02	22 52.1
11	17 33 2.58	+13.408	-22 25 4.7	-15.27	22 9.8	11	20 19 1.56	+13.021	-20 7 19.5	+36.51	22 53.4
12	17 38 24.63	13.430	22 30 51.2	13.60	22 11.2	12	20 24 13.57	12.979	19 52 25.8	37.96	22 54.6
13	17 43 47.19	13.449	22 35 57.5	11.92	22 12.6	13	20 29 24.54	12.935	19 36 57.0	39.42	22 55.8
14	17 49 10.18	13.466	22 40 23.2	10.22	22 14.0	14	20 34 34.45	12.891	19 20 53.9	40.84	22 57.0
15	17 54 33.54	13.480	22 44 8.2	8.22	22 15.5	15	20 39 43.30	12.846	19 4 17.0	42.23	22 58.2
16	17 59 57.23	+13.492	-22 47 12.2	-6.81	22 17.0	16	20 44 51.07	+12.800	-18 47 6.8	+43.60	22 59.4
17	18 5 21.18	13.502	22 49 35.1	5.09	22 18.5	17	20 49 57.73	12.754	18 29 24.2	44.94	23 0.6
18	18 10 45.33	13.510	22 51 16.5	3.36	22 19.9	18	20 55 3.27	12.707	18 11 9.7	46.26	23 1.7
19	18 16 9.62	13.515	22 52 16.4	-1.63	22 21.4	19	21 0 7.68	12.660	17 52 24.0	47.54	23 2.8
20	18 21 34.00	13.517	22 52 34.8	+0.10	22 22.8	20	21 5 10.95	12.612	17 33 7.7	48.80	23 3.9
21	18 26 58.41	+13.517	-22 52 11.6	+1.83	22 24.3	21	21 10 13.07	+12.564	-17 13 21.5	+50.03	23 5.0
22	18 32 22.78	13.514	22 51 6.7	3.57	22 25.7	22	21 15 14.04	12.516	16 53 6.1	51.24	23 6.0
23	18 37 47.06	13.509	22 49 20.2	5.31	22 27.2	23	21 20 13.86	12.468	16 32 22.2	52.42	23 7.1
24	18 43 11.19	13.502	22 46 52.0	7.05	22 28.6	24	21 25 12.53	12.420	16 11 10.5	53.56	23 8.1
25	18 48 35.12	13.492	22 43 42.1	8.78	22 30.1	25	21 30 10.06	12.372	15 49 31.7	54.67	23 9.1
26	18 53 58.78	+13.480	-22 39 50.8	+10.50	22 31.5	26	21 35 6.46	+12.326	-15 27 26.5	+55.75	23 10.1
27	18 59 22.13	13.465	22 35 18.2	12.22	22 33.0	27	21 40 1.73	12.279	15 4 55.5	56.81	23 11.1
28	19 4 45.11	13.448	22 30 4.3	13.93	22 34.4	28	21 44 55.89	12.232	14 41 59.5	57.84	23 12.0
29	19 10 7.66	13.429	22 24 9.4	15.64	22 35.9	29	21 49 48.95	12.188	14 18 39.2	58.84	23 12.9
30	19 15 29.74	13.409	22 17 33.7	17.34	22 37.3	30	21 54 40.93	12.143	13 54 55.3	59.81	23 13.8
31	19 20 51.30	+13.387	-22 10 17.5	+19.02	22 38.7	31	21 59 31.84	+12.099	-13 30 48.5	+60.75	23 14.7
32	19 26 12.29	+13.363	-22 2 20.9	+20.00	22 40.1	32	22 4 21.71	+12.056	-13 6 19.6	+61.66	23 15.5
Day of the Month.						Day of the Month.					
	1st.	6th.	11th.	16th.	21st.		5th.	10th.	15th.	20th.	25th.
Semidiameter . .	6.2	6.1	6.0	5.9	5.8	Semidiameter . . . . .	5.6	5.5	5.4	5.4	5.3
Hor. Parallax . .	6.4	6.3	6.2	6.1	6.0	Horizontal Parallax . . .	5.7	5.7	5.6	5.6	5.5

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.									
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.				
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.					
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m				
1	21 49 48.95	+12.188	-14 18 39.2	+58.84	23 12.9	1	0 14 23.00	+11.347	- 0 0 53.4	+74.63	23 35.0				
2	21 54 40.93	12.143	13 54 55.3	59.81	23 13.8	2	0 18 55.31	11.345	+ 0 28 58.1	74.65	23 35.6				
3	21 59 31.84	12.099	13 30 48.5	60.75	23 14.7	3	0 23 27.59	11.345	0 58 49.8	74.65	23 36.1				
4	22 4 21.71	12.056	13 6 19.6	61.66	23 15.5	4	0 27 59.87	11.346	1 28 41.2	74.69	23 36.7				
5	22 9 10.56	12.014	12 41 29.3	62.54	23 16.4	5	0 32 32.21	11.349	1 58 31.5	74.56	23 37.3				
6	22 13 58.40	+11.973	-12 16 18.3	+63.38	23 17.2	6	0 37 4.64	+11.354	+ 2 28 20.1	+74.48	23 37.9				
7	22 18 45.26	11.933	11 50 47.4	64.19	23 18.1	7	0 41 37.21	11.360	2 58 6.3	74.36	23 38.5				
8	22 23 31.16	11.894	11 24 57.2	64.98	23 18.9	8	0 46 9.95	11.368	3 27 49.2	74.21	23 39.1				
9	22 28 16.13	11.856	10 58 48.6	65.74	23 19.7	9	0 50 42.90	11.378	3 57 28.1	74.03	23 39.7				
10	22 33 0.20	11.818	10 32 22.2	66.46	23 20.5	10	0 55 16.12	11.390	4 27 2.3	73.82	23 40.3				
11	22 37 43.38	+11.781	-10 5 38.9	+67.16	23 21.3	11	0 59 49.64	+11.403	+ 4 56 31.1	+73.58	23 41.0				
12	22 42 25.71	11.746	9 38 39.4	67.89	23 22.0	12	1 4 23.49	11.418	5 25 53.9	73.31	23 41.6				
13	22 47 7.21	11.712	9 11 24.3	68.45	23 22.7	13	1 8 57.72	11.435	5 55 9.9	73.01	23 42.2				
14	22 51 47.91	11.680	8 43 54.5	69.04	23 23.4	14	1 13 32.35	11.453	6 24 18.3	72.68	23 42.8				
15	22 56 27.85	11.649	8 16 10.7	69.61	23 24.1	15	1 18 7.43	11.472	6 53 18.4	72.32	23 43.5				
16	23 1 7.05	+11.619	- 7 48 13.7	+70.14	23 24.8	16	1 22 42.99	+11.493	+ 7 22 9.5	+71.93	23 44.1				
17	23 5 45.55	11.580	7 20 4.1	70.64	23 25.5	17	1 27 19.07	11.516	7 50 50.9	71.51	23 44.8				
18	23 10 23.38	11.563	6 51 42.8	71.19	23 26.2	18	1 31 55.71	11.539	8 19 21.7	71.05	23 45.5				
19	23 15 0.57	11.537	6 23 10.4	71.57	23 26.9	19	1 36 32.94	11.564	8 47 41.3	70.57	23 46.2				
20	23 19 37.15	11.512	5 54 27.7	71.98	23 27.6	20	1 41 10.80	11.591	9 15 48.9	70.06	23 47.0				
21	23 24 13.17	+11.489	- 5 25 35.4	+72.36	23 28.3	21	1 45 49.31	+11.619	+ 9 43 43.9	+69.52	23 47.6				
22	23 28 48.66	11.468	4 56 34.3	72.72	23 28.9	22	1 50 28.52	11.649	10 11 25.5	68.94	23 48.3				
23	23 33 23.65	11.448	4 27 25.0	73.05	23 29.5	23	1 55 8.46	11.680	10 38 52.9	68.34	23 49.1				
24	23 37 58.19	11.430	3 58 8.3	73.34	23 30.1	24	1 59 49.16	11.712	11 6 5.4	67.71	23 49.8				
25	23 42 32.31	11.414	3 28 44.9	73.60	23 30.7	25	2 4 30.66	11.746	11 33 2.4	67.04	23 50.6				
26	23 47 6.06	+11.399	- 2 59 15.6	+73.94	23 31.3	26	2 9 12.98	+11.781	+11 59 43.0	+66.34	23 51.4				
27	23 51 39.47	11.386	2 29 41.0	74.05	23 31.9	27	2 13 56.16	11.817	12 26 6.5	65.61	23 52.2				
28	23 56 12.60	11.374	2 0 1.8	74.29	23 32.6	28	2 18 40.22	11.855	12 52 12.2	64.86	23 53.0				
29	0 0 45.47	11.365	1 30 18.8	74.36	23 33.2	29	2 23 25.20	11.894	13 17 59.4	64.07	23 53.8				
30	0 5 18.13	11.357	1 0 32.6	74.48	23 33.8	30	2 28 11.13	11.934	13 43 27.3	63.25	23 54.6				
31	0 9 50.62	+11.351	- 0 30 43.9	+74.57	23 34.4	31	2 32 58.03	+11.975	+14 8 35.2	+62.40	23 55.5				
32	0 14 23.00	+11.347	- 0 0 53.4	+74.63	23 35.0	32	2 37 45.92	+12.017	+14 33 22.3	+61.52	23 56.4				
Day of the Month.		2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.		1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . . .		5.3	5.2	5.2	5.1	5.1	5.0	Semidiameter . .		5.0	5.0	5.0	5.0	5.0	5.0
Horizontal Parallax		5.4	5.4	5.4	5.3	5.3	5.2	Hor. Parallax . .		5.2	5.2	5.2	5.1	5.1	5.1

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

**GREENWICH MEAN TIME.**

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	h m s	s	° ' "	"	h m	1	h m s	s	° ' "	"	h m
1	2 32 58.03	+11.975	+14 8 35.2	+69.40	23 55.5	1	5 10 1.15	+13.983	+23 17 11.1	+21.74	0 29.5
2	2 37 45.92	12.017	14 33 32.3	61.52	23 56.4	2	5 15 20.28	13.310	23 25 32.8	20.05	0 30.9
3	2 42 34.84	12.000	14 57 47.9	60.61	23 57.3	3	5 20 40.03	13.334	23 33 13.6	18.34	0 32.3
4	2 47 24.80	12.104	15 21 51.3	59.67	23 58.2	4	5 26 0.34	13.357	23 40 13.3	16.63	0 33.7
5	2 52 15.82	12.148	15 45 31.8	58.70	23 59.1	5	5 31 21.17	13.378	23 46 31.5	14.89	0 35.1
6	2 57 7.92	+12.193	+16 8 46.5	+57.70		6	5 36 42.46	+13.396	+23 52 7.9	+13.14	0 36.5
7	3 2 1.11	12.239	16 31 40.8	56.66	0 0.0	7	5 42 4.17	13.419	23 57 2.3	11.38	0 37.9
8	3 6 55.40	12.285	16 54 8.0	55.59	0 1.0	8	5 47 26.24	13.436	24 1 14.5	9.63	0 39.3
9	3 11 50.81	12.332	17 16 9.3	54.50	0 2.0	9	5 52 48.60	13.437	24 4 44.2	7.85	0 40.7
10	3 16 47.35	12.379	17 37 44.0	53.38	0 3.0	10	5 58 11.20	13.446	24 7 31.3	6.07	0 42.1
11	3 21 45.02	+12.426	+17 58 51.4	+52.22	0 4.0	11	6 3 33.97	+13.452	+24 9 35.6	+ 4.98	0 43.6
12	3 26 43.83	12.473	18 19 30.6	51.03	0 5.1	12	6 8 56.86	13.455	24 10 56.9	2.49	0 45.0
13	3 31 43.77	12.521	18 39 41.0	49.82	0 6.1	13	6 14 19.79	13.456	24 11 35.3	+ 0.70	0 46.5
14	3 36 44.84	12.568	18 59 21.9	48.58	0 7.2	14	6 19 42.71	13.454	24 11 30.7	- 1.09	0 47.9
15	3 41 47.03	12.615	19 18 32.7	47.31	0 8.3	15	6 25 5.55	13.449	24 10 43.0	2.88	0 49.4
16	3 46 50.34	+12.661	+19 37 12.5	+46.01	0 9.4	16	6 30 29.26	+13.442	+24 9 12.4	- 4.67	0 50.8
17	3 51 54.77	12.707	19 55 20.7	44.68	0 10.5	17	6 35 50.77	13.432	24 6 58.8	6.46	0 52.3
18	3 57 0.29	12.752	20 12 56.7	43.39	0 11.7	18	6 41 13.01	13.420	24 4 2.3	8.25	0 53.7
19	4 2 6.88	12.797	20 29 59.8	41.94	0 12.9	19	6 46 34.93	13.405	24 0 23.0	10.03	0 55.1
20	4 7 14.55	12.841	20 46 29.3	40.53	0 14.1	20	6 51 56.46	13.388	23 56 1.0	11.80	0 56.5
21	4 12 23.27	+12.885	+21 2 24.7	+39.09	0 15.3	21	6 57 17.54	+13.368	+23 50 56.6	-13.56	0 58.0
22	4 17 33.02	12.928	21 17 45.3	37.63	0 16.5	22	7 2 38.12	13.346	23 45 9.9	15.32	0 59.4
23	4 22 43.78	12.970	21 32 30.5	36.14	0 17.7	23	7 7 58.14	13.321	23 38 41.2	17.07	1 0.8
24	4 27 55.52	13.010	21 46 39.6	34.63	0 19.0	24	7 13 17.55	13.295	23 31 30.8	18.80	1 2.2
25	4 33 8.92	13.049	22 0 12.1	33.09	0 20.2	25	7 18 36.30	13.267	23 23 38.8	20.52	1 3.5
26	4 38 21.85	+13.087	+22 13 7.4	+31.53	0 21.5	26	7 23 54.33	+13.236	+23 15 5.7	-22.23	1 4.

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	7 50 12.23	+13.055	+22 22 15.5	-30.54	1 11.4	1	10 22 47.33	+11.547	+11 43 11.8	-68.02	1 41.8
2	7 55 25.07	13.014	22 9 43.5	32.15	1 12.7	2	10 27 23.95	11.505	11 15 50.3	68.76	1 42.5
3	8 0 36.91	12.972	21 56 33.2	33.73	1 13.9	3	10 31 59.60	11.465	10 48 11.4	69.48	1 43.2
4	8 5 47.72	12.928	21 42 45.2	35.29	1 15.2	4	10 36 34.30	11.426	10 20 15.7	70.16	1 43.8
5	8 10 57.46	12.883	21 28 20.0	36.83	1 16.4	5	10 41 8.08	11.389	9 52 4.0	70.81	1 44.4
6	8 16 6.12	+12.837	+21 13 18.1	-38.34	1 17.6	6	10 45 40.97	+11.353	+ 9 23 36.9	-71.43	1 45.0
7	8 21 13.66	12.790	20 57 40.0	39.83	1 18.8	7	10 50 13.01	11.318	8 54 55.3	72.03	1 45.6
8	8 26 20.05	12.742	20 41 26.5	41.39	1 20.0	8	10 54 44.24	11.285	8 25 59.8	72.59	1 46.2
9	8 31 25.28	12.693	20 24 38.1	42.73	1 21.1	9	10 59 14.69	11.253	7 56 51.3	73.12	1 46.8
10	8 36 29.33	12.644	20 7 15.3	44.15	1 22.2	10	11 3 44.39	11.222	7 27 30.2	73.69	1 47.3
11	8 41 32.18	+12.593	+19 49 18.9	-45.54	1 23.3	11	11 8 13.36	+11.193	+ 6 57 57.5	-74.10	1 47.9
12	8 46 33.82	12.549	19 30 49.6	46.90	1 24.4	12	11 12 41.65	11.163	6 28 13.8	74.54	1 48.4
13	8 51 34.21	12.499	19 11 47.8	48.24	1 25.5	13	11 17 9.29	11.130	5 58 20.0	74.95	1 48.9
14	8 56 33.36	12.438	18 52 14.3	49.55	1 26.6	14	11 21 36.32	11.114	5 28 16.6	75.33	1 49.4
15	9 1 31.25	12.386	18 32 9.8	50.83	1 27.6	15	11 26 2.77	11.091	4 58 4.4	75.68	1 49.9
16	9 6 27.88	+12.333	+18 11 34.0	-52.08	1 28.6	16	11 30 28.68	+11.069	+ 4 27 44.0	-76.00	1 50.4
17	9 11 23.26	12.281	17 50 30.4	53.39	1 29.6	17	11 34 54.09	11.049	3 57 16.2	76.30	1 50.9
18	9 16 17.38	12.228	17 28 57.1	54.48	1 30.6	18	11 39 19.03	11.030	3 26 41.7	76.57	1 51.3
19	9 21 10.23	12.176	17 6 55.5	55.64	1 31.5	19	11 43 43.55	11.013	2 56 1.4	76.81	1 51.8
20	9 26 1.81	12.123	16 44 26.4	56.78	1 32.4	20	11 48 7.67	10.996	2 25 15.7	77.01	1 52.2
21	9 30 52.15	+12.071	+16 21 30.5	-57.88	1 33.3	21	11 52 31.44	+10.984	+ 1 54 25.4	-77.18	1 52.7
22	9 35 41.25	12.020	15 58 8.5	58.95	1 34.2	22	11 56 54.91	10.972	1 23 31.3	77.32	1 53.1
23	9 40 29.11	11.969	15 34 21.1	59.99	1 35.0	23	12 1 18.12	10.962	0 52 34.1	77.44	1 53.6
24	9 45 15.75	11.918	15 10 9.1	61.00	1 35.8	24	12 5 41.10	10.954	+ 0 21 34.3	77.53	1 54.0
25	9 50 1.18	11.868	14 45 33.2	61.98	1 36.6	25	12 10 3.89	10.947	- 0 9 27.3	77.59	1 54.5
26	9 54 45.43	+11.819	+14 20 34.0	-62.94	1 37.4	26	12 14 26.55	+10.942	- 0 40 30.0	-77.62	1 54.9
27	9 59 29.52	11.772	13 55 12.3	63.86	1 38.2	27	12 18 49.12	10.939	1 11 33.1	77.63	1 55.4
28	10 4 10.46	11.725	13 29 28.9	64.75	1 39.0	28	12 23 11.04	10.938	1 42 36.1	77.61	1 55.8
29	10 8 51.29	11.679	13 3 24.4	65.61	1 39.7	29	12 27 34.16	10.939	2 13 38.3	77.56	1 56.2
30	10 13 31.03	11.634	12 36 59.5	66.45	1 40.4	30	12 31 56.73	10.941	2 44 38.7	77.48	1 56.6
31	10 18 9.70	+11.590	+12 10 15.1	-67.25	1 41.1	31	12 36 19.35	+10.945	- 3 15 36.8	-77.37	1 57.1
32	10 22 47.33	+11.547	+11 43 11.8	-68.02	1 41.8	32	12 40 42.10	+10.951	- 3 46 32.0	-77.23	1 57.5
Day of the Month.						Day of the Month.					
5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th. 29th.					
Semidiameter . . 5.2 5.3 5.4 5.4 5.5 5.6						Semidiameter . . 5.7 5.8 5.9 6.0 6.1 6.2					
Hor. Parallax . . 5.4 5.5 5.6 5.6 5.7 5.8						Hor. Parallax . . 5.9 6.0 6.1 6.2 6.3 6.4					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	12 40 42.10	+10.951	- 3 43 32.0	-77.92	1 57.5	1	14 56 4.45	+11.796	-17 52 23.6	-59.91	2 14.6
2	12 45 5.03	10.958	4 17 23.5	77.06	1 58.0	2	15 0 48.07	11.840	18 15 52.1	58.15	2 15.4
3	12 49 28.17	10.968	4 48 10.6	76.86	1 58.4	3	15 5 32.75	11.884	18 38 54.6	57.05	2 16.2
4	12 53 51.55	10.979	5 18 52.7	76.64	1 58.9	4	15 10 18.49	11.929	19 1 30.3	55.92	2 17.0
5	12 58 15.23	10.992	5 49 29.1	76.39	1 59.3	5	15 15 5.30	11.973	19 23 34.7	54.76	2 17.9
6	13 2 39.24	+11.007	- 6 19 59.0	-76.10	1 59.8	6	15 19 53.17	+12.017	-19 45 19.0	-53.58	2 18.7
7	13 7 3.62	11.023	6 50 21.8	75.79	2 0.2	7	15 24 42.10	12.061	20 6 30.4	52.37	2 19.6
8	13 11 28.41	11.041	7 20 36.8	75.45	2 0.7	8	15 29 32.09	12.105	20 27 12.3	51.19	2 20.5
9	13 15 53.64	11.060	7 50 43.2	75.07	2 1.2	9	15 34 23.13	12.148	20 47 23.9	49.84	2 21.4
10	13 20 19.36	11.081	8 20 40.2	74.67	2 1.7	10	15 39 15.20	12.191	21 7 4.5	48.54	2 22.3
11	13 24 45.59	+11.103	- 8 50 27.2	-74.24	2 2.2	11	15 44 8.29	+12.233	-21 26 13.5	-47.31	2 23.3
12	13 29 12.36	11.127	9 20 3.6	73.78	2 2.7	12	15 49 2.38	12.274	21 44 50.4	45.85	2 24.2
13	13 33 39.71	11.152	9 49 28.5	73.29	2 3.2	13	15 53 57.44	12.314	22 2 54.3	44.46	2 25.2
14	13 38 7.68	11.178	10 18 41.1	72.76	2 3.7	14	15 58 53.44	12.353	22 20 24.6	43.05	2 26.2
15	13 42 36.29	11.206	10 47 40.9	72.21	2 4.2	15	16 3 50.35	12.391	22 37 20.7	41.61	2 27.2
16	13 47 5.58	+11.235	-11 16 27.0	-71.63	2 4.7	16	16 8 48.14	+12.427	-22 53 41.9	-40.15	2 28.2
17	13 51 35.57	11.265	11 44 58.8	71.02	2 5.3	17	16 13 46.80	12.462	23 9 27.8	38.66	2 29.2
18	13 56 6.29	11.296	12 13 15.4	70.37	2 5.9	18	16 18 46.28	12.495	23 24 37.7	37.15	2 30.3
19	14 0 37.77	11.328	12 41 16.2	69.69	2 6.5	19	16 23 46.55	12.527	23 39 11.1	35.69	2 31.4
20	14 5 10.03	11.362	13 9 0.4	68.98	2 7.1	20	16 28 47.56	12.557	23 53 7.3	34.06	2 32.5
21	14 9 43.11	+11.397	-13 36 27.3	-68.24	2 7.7	21	16 33 49.26	+12.586	-24 6 25.9	-32.46	2 33.6
22	14 14 17.04	11.432	14 3 36.2	67.48	2 8.3	22	16 38 51.61	12.612	24 19 6.4	30.88	2 34.7
23	14 18 51.85	11.469	14 30 26.3	66.68	2 8.9	23	16 43 54.57	12.636	24 31 8.3	29.26	2 35.8
24	14 23 27.56	11.507	14 56 56.8	65.85	2 9.5	24	16 48 58.09	12.658	24 42 31.1	27.63	2 36.9
25	14 28 4.20	11.546	15 23 7.1	64.99	2 10.2	25	16 54 2.12	12.678	24 53 14.4	25.96	2 38.0
26	14 32 41.77	+11.585	-15 48 56.5	-64.11	2 10.9	26	16 59 6.59	+12.695	-25 3 17.9	-24.31	2 39.1
27	14 37 20.30	11.626	16 14 24.2	63.19	2 11.6	27	17 4 11.47	12.710	25 12 41.2	22.63	2 40.3
28	14 41 50.81	11.667	16 39 29.4	62.24	2 12.3	28	17 9 16.69	12.723	25 21 24.0	20.93	2 41.4
29	14 46 40.33	11.709	17 4 11.6	61.26	2 13.1	29	17 14 22.19	12.734	25 29 25.8	19.22	2 42.6
30	14 51 21.87	11.752	17 28 29.9	60.25	2 13.8	30	17 19 27.90	12.749	25 36 46.5	17.50	2 43.7
31	14 56 4.45	+11.796	-17 52 23.6	-59.91	2 14.6	31	17 24 33.77	+12.748	-25 43 25.9	-15.77	2 44.9
32	15 0 48.07	+11.840	-18 15 52.1	-58.15	2 15.4	32	17 29 39.72	+12.750	-25 49 23.7	-14.03	2 46.0
Day of the Month.						Day of the Month.					
3d. 8th. 13th. 18th. 23d. 28th.						3d. 8th. 13th. 18th. 23d. 28th.					
Semidiameter . . 6.4 6.5 6.7 6.8 7.0 7.2						Semidiameter . . 7.4 7.6 7.9 8.2 8.4 8.7					
Hor. Parallax . . 6.6 6.8 6.9 7.1 7.3 7.5						Hor. Parallax . . 7.7 7.9 8.2 8.4 8.7 9.0					

**NOTE.**—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m			
1	17 29 39.72	+12.750	-25 49 23.7	-14.03	2 46.0	1	19 56 44.76	+11.272	-23 30 43.7	+35.08	3 14.8			
2	17 34 45.70	12.749	25 54 39.6	12.99	2 47.2	2	20 1 14.15	11.176	23 16 26.0	36.40	3 15.3			
3	17 39 51.63	12.745	25 59 13.6	10.54	2 48.3	3	20 5 41.21	11.078	23 1 37.1	37.09	3 15.8			
4	17 44 57.44	12.738	26 3 5.4	8.78	2 49.5	4	20 10 5.87	10.977	22 46 17.6	38.94	3 16.3			
5	17 50 3.03	12.736	26 6 15.1	7.02	2 50.6	5	20 14 28.07	10.873	22 30 28.5	40.16	3 16.7			
6	17 55 8.34	+12.714	-26 8 42.6	-5.36	2 51.8	6	20 18 47.75	+10.769	-22 14 10.4	+41.35	3 17.1			
7	18 0 13.28	12.697	26 10 28.0	3.51	2 52.9	7	20 23 4.85	10.658	21 57 24.3	42.50	3 17.4			
8	18 5 17.77	12.677	26 11 31.1	-1.75	2 54.1	8	20 27 19.32	10.547	21 40 17.9	43.61	3 17.7			
9	18 10 21.73	12.653	26 11 52.1	0.00	2 55.2	9	20 31 31.08	10.433	21 22 31.2	44.09	3 18.0			
10	18 15 25.07	12.625	26 11 30.9	+1.75	2 56.3	10	20 35 40.07	10.316	21 4 26.1	45.73	3 18.2			
11	18 20 27.71	+12.594	-26 10 27.8	+3.50	2 57.4	11	20 39 46.22	+10.196	-20 45 56.6	+46.73	3 18.4			
12	18 25 29.55	12.559	26 8 42.9	5.94	2 58.5	12	20 43 49.46	10.073	20 27 3.5	47.69	3 18.5			
13	18 30 30.51	12.521	26 6 16.5	6.97	2 59.6	13	20 47 49.72	9.948	20 7 47.8	48.61	3 18.6			
14	18 35 30.50	12.479	26 3 8.7	8.69	3 0.6	14	20 51 46.94	9.820	19 48 10.4	49.50	3 18.6			
15	18 40 29.45	12.433	25 59 19.7	10.39	3 1.7	15	20 55 41.07	9.690	19 28 12.4	50.34	3 18.5			
16	18 45 27.26	+12.384	-25 54 50.0	+12.08	3 2.7	16	20 59 32.03	+9.557	-19 7 54.6	+51.14	3 18.4			
17	18 50 23.85	12.331	25 49 39.9	13.76	3 3.7	17	21 3 19.75	9.420	18 47 18.1	51.90	3 18.2			
18	18 55 19.12	12.275	25 43 49.6	15.42	3 4.7	18	21 7 4.16	9.280	18 26 23.9	52.69	3 18.0			
19	19 0 13.00	12.215	25 37 19.5	17.07	3 5.7	19	21 10 45.20	9.138	18 5 13.0	53.59	3 17.7			
20	19 5 5.41	12.159	25 30 10.1	18.70	3 6.6	20	21 14 22.79	8.993	17 43 46.5	53.92	3 17.4			
21	19 9 56.29	+12.086	-25 22 21.9	+20.31	3 7.5	21	21 17 56.86	+8.846	-17 22 5.3	+54.51	3 17.0			
22	19 14 45.55	12.017	25 13 55.4	21.90	3 8.4	22	21 21 27.36	8.696	17 0 10.5	55.05	3 16.6			
23	19 19 33.12	11.945	25 4 51.1	23.46	3 9.2	23	21 24 54.20	8.542	16 38 3.2	55.55	3 16.1			
24	19 24 18.93	11.870	24 55 9.4	25.00	3 10.0	24	21 28 17.33	8.385	16 15 44.4	56.01	3 15.6			
25	19 29 2.91	11.793	24 44 51.0	26.52	3 10.8	25	21 31 36.66	8.225	15 53 15.2	56.42	3 15.0			
26	19 33 44.99	+11.713	-24 33 56.4	+28.01	3 11.5	26	21 34 52.11	+8.062	-15 30 36.7	+56.78	3 14.3			
27	19 38 25.12	11.630	24 22 26.3	29.48	3 12.2	27	21 38 3.61	7.895	15 7 50.0	57.10	3 13.5			
28	19 43 3.22	11.544	24 10 21.3	30.92	3 12.9	28	21 41 11.06	7.725	14 44 56.2	57.37	3 12.6			
29	19 47 39.23	11.456	23 57 42.1	32.34	3 13.6	29	21 44 14.37	7.551	14 21 56.5	57.60	3 11.7			
30	19 52 13.10	11.365	23 44 29.3	33.73	3 14.2	30	21 47 13.46	7.373	13 58 51.9	57.78	3 10.7			
31	19 56 44.76	+11.272	-23 30 43.7	+35.08	3 14.8	31	21 50 8.22	+7.190	-13 35 43.7	+57.90	3 9.7			
32	20 1 14.15	+11.176	-23 16 26.0	+36.40	3 15.3	32	21 52 58.55	+7.003	-13 12 33.3	+57.97	3 8.6			
Day of the Month.						Day of the Month.								
	2d.	7th.	12th.	17th.	22d.	27th.		2d.	7th.	12th.	17th.	22d.	27th.	32d.
Semidiameter . .	9.1	9.4	9.8	10.3	10.7	11.3	Semidiameter . .	11.9	12.5	13.2	14.0	14.9	16.0	17.1
Hor. Parallax . .	9.4	9.8	10.2	10.6	11.1	11.7	Hor. Parallax . .	12.3	12.9	13.7	14.5	15.5	16.5	17.7

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	19 30 28.11	+8.347	-22 51 34.7	+17.33	0 45.2	1	21 11 32.22	+7.900	-17 21 11.1	+34.93	0 24.1
2	19 33 48.33	8.338	22 44 30.9	17.98	0 44.6	2	21 14 41.60	7.883	17 7 7.1	35.30	0 23.3
3	19 37 8.34	8.329	22 37 11.5	18.63	0 44.0	3	21 17 50.54	7.864	16 52 52.2	35.84	0 22.5
4	19 40 28.13	8.320	22 29 36.7	19.37	0 43.4	4	21 20 59.05	7.846	16 38 26.6	36.38	0 21.7
5	19 43 47.70	8.310	22 21 46.4	19.91	0 42.8	5	21 24 7.13	7.828	16 23 50.5	36.71	0 20.9
6	19 47 7.03	+8.300	-22 13 40.8	+20.55	0 42.2	6	21 27 14.79	+7.810	-16 9 4.2	+37.14	0 20.1
7	19 50 26.10	8.289	22 5 20.0	21.18	0 41.6	7	21 30 22.00	7.792	15 54 7.8	37.55	0 19.2
8	19 53 44.92	8.278	21 56 44.1	21.81	0 40.9	8	21 33 28.79	7.774	15 39 1.5	37.96	0 18.4
9	19 57 3.46	8.267	21 47 53.1	22.43	0 40.3	9	21 36 35.15	7.756	15 23 45.5	38.36	0 17.6
10	20 0 21.72	8.255	21 38 47.4	23.04	0 39.7	10	21 39 41.09	7.738	15 8 20.0	38.75	0 16.7
11	20 3 39.69	+8.242	-21 29 27.0	+23.65	0 39.0	11	21 42 46.60	+7.720	-14 52 45.3	+39.13	0 15.9
12	20 6 57.34	8.229	21 19 52.1	24.26	0 38.4	12	21 45 51.67	7.702	14 37 1.5	39.51	0 15.0
13	20 10 14.68	8.216	21 10 2.7	24.86	0 37.7	13	21 48 56.33	7.685	14 21 8.9	39.87	0 14.2
14	20 13 31.70	8.202	20 59 59.0	25.45	0 37.1	14	21 52 0.55	7.667	14 5 7.6	40.23	0 13.3
15	20 16 48.38	8.188	20 49 41.1	26.04	0 36.4	15	21 55 4.35	7.650	13 48 58.0	40.57	0 12.4
16	20 20 4.72	+8.173	-20 39 9.2	+26.62	0 35.7	16	21 58 7.73	+7.632	-13 32 40.2	+40.91	0 11.5
17	20 23 20.70	8.158	20 28 23.5	27.19	0 35.0	17	22 1 10.68	7.614	13 16 14.3	41.24	0 10.7
18	20 26 36.31	8.142	20 17 24.1	27.75	0 34.3	18	22 4 13.21	7.597	12 59 40.7	41.56	0 9.8
19	20 29 51.53	8.126	20 6 11.3	28.31	0 33.7	19	22 7 15.33	7.580	12 42 59.6	41.87	0 8.9
20	20 33 6.36	8.110	19 54 45.1	28.86	0 33.0	20	22 10 17.03	7.563	12 26 11.1	42.17	0 8.0
21	20 36 20.82	+8.094	-19 43 5.7	+29.41	0 32.3	21	22 13 18.32	+7.545	-12 9 15.5	+42.46	0 7.0
22	20 39 34.87	8.077	19 31 13.2	29.95	0 31.5	22	22 16 19.20	7.528	11 52 12.9	42.75	0 6.1
23	20 42 48.51	8.059	19 19 7.9	30.48	0 30.8	23	22 19 19.67	7.511	11 35 3.7	43.02	0 5.1
24	20 46 1.73	8.042	19 6 49.9	31.01	0 30.1	24	22 22 19.75	7.495	11 17 48.0	43.28	0 4.2
25	20 49 14.54	8.025	18 54 19.4	31.53	0 29.4	25	22 25 19.43	7.479	11 0 26.0	43.54	0 3.3
26	20 52 26.92	+8.007	-18 41 36.6	+32.04	0 28.7	26	22 28 18.73	+7.463	-10 42 57.9	+43.79	0 2.3
27	20 55 38.88	7.990	18 28 41.7	32.54	0 27.9	27	22 31 17.65	7.447	10 25 23.9	44.03	0 1.3
28	20 58 50.42	7.972	18 15 34.8	33.03	0 27.2	28	22 34 16.20	7.432	10 7 44.2	44.27	0 0.4
29	21 2 1.51	7.954	18 2 16.1	33.52	0 26.4	29	22 37 14.38	7.417	9 49 59.0	44.49	23 58.4
30	21 5 12.18	7.936	17 48 45.8	34.00	0 25.7	30	22 40 12.20	7.402	9 32 8.5	44.71	23 57.4
31	21 8 22.42	+7.918	-17 35 4.1	+34.47	0 24.9	31	22 43 9.68	+7.386	-9 14 12.9	+44.92	23 56.5
32	21 11 32.22	+7.900	-17 21 11.1	+34.93	0 24.1	32	22 46 6.81	+7.374	-8 56 12.5	+45.12	23 55.5
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th. 25th. 30th.					
Semidiameter . .						Semidiameter . .					
Hor. Parallax . .						Hor. Parallax . .					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.



## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	22 37 14.38	+7.417	-9 49 59.0	+44.40	23 58.4	1	0 6 56.91	+7.101	-0 12 51.3	+47.96	23 25.8
2	22 40 12.20	7.409	9 32 8.5	44.71	23 57.4	2	0 9 47.28	7.096	+0 6 2.2	47.91	23 24.7
3	22 43 9.68	7.398	9 14 12.9	44.99	23 56.5	3	0 12 37.54	7.092	0 24 54.6	47.16	23 23.6
4	22 46 6.81	7.374	8 56 12.5	45.19	23 55.5	4	0 15 27.69	7.088	0 43 45.8	47.10	23 22.5
5	22 49 3.61	7.360	8 38 7.3	45.30	23 54.5	5	0 18 17.75	7.084	1 2 35.5	47.04	23 21.4
6	22 52 0.09	+7.347	-8 19 57.8	+45.48	23 53.4	6	0 21 7.73	+7.081	+1 21 23.7	+46.97	23 20.3
7	22 54 56.25	7.334	8 1 44.0	45.66	23 52.4	7	0 23 57.63	7.079	1 40 10.1	46.89	23 19.2
8	22 57 52.10	7.321	7 43 26.0	45.83	23 51.4	8	0 26 47.47	7.076	1 58 54.6	46.80	23 18.1
9	23 0 47.65	7.308	7 25 4.2	45.98	23 50.4	9	0 29 37.25	7.073	2 17 36.9	46.71	23 17.0
10	23 3 42.91	7.296	7 6 38.8	46.13	23 49.4	10	0 32 26.97	7.071	2 36 16.9	46.61	23 15.8
11	23 6 37.87	+7.284	-6 48 9.9	+46.27	23 48.4	11	0 35 16.66	+7.069	+2 54 54.4	+46.51	23 14.7
12	23 9 32.55	7.273	6 29 37.8	46.40	23 47.3	12	0 38 6.30	7.067	3 13 29.2	46.39	23 13.6
13	23 12 26.96	7.261	6 11 2.6	46.52	23 46.3	13	0 40 55.90	7.066	3 32 1.2	46.37	23 12.5
14	23 15 21.09	7.250	5 52 24.0	46.64	23 45.2	14	0 43 45.48	7.065	3 50 30.1	46.14	23 11.4
15	23 18 14.97	7.239	5 33 44.0	46.74	23 44.2	15	0 46 35.04	7.065	4 8 55.7	46.00	23 10.2
16	23 21 8.58	+7.229	-5 15 1.0	+46.84	23 43.1	16	0 49 24.58	+7.064	+4 27 17.9	+45.85	23 9.1
17	23 24 1.94	7.218	4 56 15.8	46.92	23 42.1	17	0 52 14.10	7.063	4 45 36.5	45.70	23 8.0
18	23 26 55.05	7.206	4 37 28.7	47.00	23 41.0	18	0 55 3.62	7.063	5 3 51.3	45.54	23 6.9
19	23 29 47.92	7.196	4 18 39.8	47.07	23 40.0	19	0 57 53.13	7.063	5 22 2.2	45.37	23 5.8
20	23 32 40.56	7.189	3 59 49.2	47.13	23 38.9	20	1 0 42.66	7.064	5 40 8.9	45.19	23 4.7
21	23 35 32.98	+7.179	-3 40 57.3	+47.18	23 37.9	21	1 3 32.21	+7.065	+5 58 11.4	+45.01	23 3.6
22	23 38 25.17	7.170	3 22 4.3	47.23	23 36.8	22	1 6 21.78	7.066	6 16 9.5	44.89	23 2.4
23	23 41 17.15	7.162	3 3 10.3	47.27	23 35.7	23	1 9 11.37	7.067	6 34 2.9	44.69	23 1.3
24	23 44 8.93	7.154	2 44 15.5	47.30	23 34.6	24	1 12 0.99	7.068	6 51 51.5	44.49	23 0.2
25	23 47 0.52	7.146	2 25 20.1	47.32	23 33.5	25	1 14 50.66	7.070	7 9 35.2	44.31	22 59.1
26	23 49 51.92	+7.138	-2 6 24.3	+47.33	23 32.4	26	1 17 40.37	+7.072	+7 27 13.8	+43.99	22 58.0
27	23 52 43.14	7.131	1 47 28.2	47.33	23 31.3	27	1 20 30.15	7.075	7 44 47.1	43.77	22 56.9
28	23 55 34.19	7.124	1 28 32.2	47.33	23 30.2	28	1 23 19.99	7.078	8 2 15.1	43.54	22 55.8
29	23 58 25.08	7.118	1 9 36.3	47.32	23 29.1	29	1 26 9.90	7.081	8 19 37.4	43.31	22 54.7
30	0 1 15.82	7.112	0 50 40.8	47.30	23 28.0	30	1 28 59.89	7.085	8 36 54.1	43.07	22 53.6
31	0 4 6.43	+7.106	-0 31 45.7	+47.26	23 26.9	31	1 31 49.97	+7.089	+8 54 4.9	+42.83	22 52.5
32	0 6 56.91	+7.101	-0 12 51.3	+47.26	23 25.8	32	1 34 40.14	+7.093	+9 11 9.8	+42.58	22 51.4
Day of the Month.						Day of the Month.					
2d. 7th. 12th. 17th. 22d. 27th.						1st. 6th. 11th. 16th. 21st. 26th.					
Semidiameter . . . 2.1 2.1 2.1 2.1 2.1 2.1						Semidiameter . . 2.1 2.1 2.1 2.2 2.2 2.2					
Horizontal Parallax 3.7 3.7 3.7 3.7 3.7 3.7						Hor. Parallax . . 3.8 3.8 3.8 3.8 3.8 3.8					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.											
MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			h m	h m s	s	° ' "	
1	1 31 49.97	+7.089	+ 8 54 4.9	+49.83	22 52.5	1	3 0 48.21	+7.977	+16 44 57.9	+32.92	22 19.4
2	1 34 40.14	7.093	9 11 9.8	49.58	22 51.4	2	3 3 42.95	7.985	16 57 46.0	31.79	22 18.3
3	1 37 30.42	7.097	9 28 8.4	49.39	22 50.3	3	3 6 37.87	7.999	17 10 23.9	31.36	22 17.3
4	1 40 20.81	7.101	9 45 0.8	49.05	22 49.2	4	3 9 32.97	7.999	17 22 51.4	30.93	22 16.2
5	1 43 11.30	7.106	10 1 46.8	41.77	22 48.1	5	3 12 28.24	7.996	17 35 8.5	30.49	22 15.2
6	1 46 1.92	+7.111	+10 18 26.1	+41.50	22 47.0	6	3 15 23.69	+7.314	+17 47 15.0	+30.05	22 14.2
7	1 48 52.66	7.117	10 34 58.7	41.99	22 45.9	7	3 18 19.31	7.321	17 59 10.8	29.60	22 13.2
8	1 51 43.53	7.123	10 51 24.4	40.99	22 44.8	8	3 21 15.00	7.329	18 10 55.8	29.15	22 12.2
9	1 54 34.52	7.126	11 7 42.9	40.69	22 43.7	9	3 24 11.03	7.334	18 22 30.0	28.70	22 11.2
10	1 57 25.65	7.133	11 23 54.3	40.39	22 42.6	10	3 27 7.13	7.341	18 33 53.2	28.24	22 10.2
11	2 0 16.92	+7.139	+11 39 58.3	+40.01	22 41.5	11	3 30 3.39	+7.347	+18 45 5.3	+27.77	22 9.2
12	2 3 8.32	7.144	11 55 54.9	39.70	22 40.4	12	3 32 59.79	7.353	18 56 6.3	27.30	22 8.2
13	2 5 59.56	7.150	12 11 43.9	39.36	22 39.4	13	3 35 56.33	7.359	19 6 56.0	26.83	22 7.2
14	2 8 51.55	7.156	12 27 25.1	39.05	22 38.3	14	3 38 53.02	7.365	19 17 34.4	26.35	22 6.2
15	2 11 43.38	7.162	12 42 58.3	38.71	22 37.2	15	3 41 49.83	7.370	19 28 1.3	25.87	22 5.2
16	2 14 35.35	+7.168	+12 58 23.4	+38.37	22 36.1	16	3 44 46.77	+7.375	+19 38 16.7	+25.40	22 4.2
17	2 17 27.47	7.175	13 13 40.2	38.03	22 35.1	17	3 47 43.83	7.380	19 48 20.5	24.99	22 3.2
18	2 20 19.73	7.181	13 28 48.7	37.68	22 34.0	18	3 50 41.01	7.385	19 58 12.7	24.43	22 2.2
19	2 23 12.15	7.188	13 43 48.7	37.39	22 32.9	19	3 53 38.31	7.390	20 7 53.1	23.94	22 1.2
20	2 26 4.72	7.194	13 58 40.1	36.96	22 31.8	20	3 56 35.71	7.394	20 17 21.7	23.45	22 0.3
21	2 28 57.44	+7.200	+14 13 22.7	+36.59	22 30.8	21	3 59 33.21	+7.398	+20 26 38.5	+22.95	21 59.3
22	2 31 50.32	7.206	14 27 56.4	36.29	22 29.7	22	4 2 30.81	7.402	20 35 43.3	22.45	21 58.3
23	2 34 43.36	7.213	14 42 21.1	35.84	22 28.7	23	4 5 28.51	7.408	20 44 36.0	21.95	21 57.3
24	2 37 36.55	7.220	14 56 36.6	35.46	22 27.6	24	4 8 26.29	7.410	20 53 16.8	21.45	21 56.3
25	2 40 29.91	7.227	15 10 42.9	35.07	22 26.6	25	4 11 24.17	7.413	21 1 45.4	20.94	21 55.3
26	2 43 23.43	+7.234	+15 24 39.8	+34.67	22 25.5	26	4 14 22.12	+7.417	+21 10 1.8	+20.43	21 54.4
27	2 46 17.13	7.241	15 38 27.2	34.27	22 24.5	27	4 17 20.16	7.420	21 18 6.0	19.92	21 53.4
28	2 49 10.99	7.248	15 52 5.0	33.87	22 23.4	28	4 20 18.26	7.423	21 25 58.0	19.41	21 52.4
29	2 52 5.03	7.255	16 5 33.1	33.47	22 22.4	29	4 23 16.43	7.425	21 33 37.6	18.89	21 51.4
30	2 54 59.25	7.262	16 18 51.3	33.06	22 21.4	30	4 26 14.67	7.427	21 41 4.9	18.38	21 50.4
31	2 57 53.64	+7.270	+16 31 59.6	+32.64	22 20.4	31	4 29 12.95	+7.429	+21 48 19.9	+17.86	21 49.5
32	3 0 48.21	+7.277	+16 44 57.9	+32.22	22 19.4	32	4 32 11.29	+7.431	+21 55 22.4	+17.35	21 48.6
Day of the Month.						Day of the Month.					
1st.						5th.					
6th.						10th.					
11th.						15th.					
16th.						20th.					
21st.						25th.					
26th.						30th.					
31st.											
Semidiameter . .						Semidiameter . .					
Hor. Parallax . .						Hor. Parallax . .					
2.2						2.2					
3.8						3.8					
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3.8						3.9					
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## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	4 29 12.95	+7.429	+21 48 19.9	+17.86	21 49.5	1	6 0 56.69	+7.302	+23 49 14.0	+ 1.70	21 19.0
2	4 32 11.29	7.431	21 55 22.4	17.35	21 48.6	2	6 3 51.83	7.299	23 49 48.8	1.90	21 18.0
3	4 35 9.68	7.433	22 2 12.5	16.83	21 47.6	3	6 6 46.72	7.299	23 50 11.4	0.70	21 16.9
4	4 38 8.09	7.434	22 8 50.1	16.31	21 46.6	4	6 9 41.36	7.271	23 50 22.0	+ 0.90	21 15.9
5	4 41 6.53	7.435	22 15 15.2	15.79	21 45.6	5	6 12 35.72	7.250	23 50 20.8	- 0.30	21 14.8
6	4 44 4.98	+7.436	+22 21 27.8	+15.27	21 44.7	6	6 15 29.79	+7.247	+23 50 7.6	- 0.80	21 13.8
7	4 47 3.44	7.436	22 27 27.8	14.74	21 43.7	7	6 18 23.57	7.225	23 49 42.6	1.99	21 12.8
8	4 50 1.89	7.435	22 33 15.2	14.22	21 42.7	8	6 21 17.04	7.202	23 49 5.9	1.77	21 11.7
9	4 53 0.32	7.434	22 38 50.0	13.69	21 41.7	9	6 24 10.21	7.206	23 48 17.6	2.25	21 10.7
10	4 55 58.73	7.433	22 44 12.2	13.16	21 40.7	10	6 27 3.04	7.194	23 47 17.7	2.73	21 9.6
11	4 58 57.10	+7.431	+22 49 21.7	+12.63	21 39.8	11	6 29 55.53	+7.180	+23 46 6.3	- 3.21	21 8.5
12	5 1 55.42	7.429	22 54 18.6	12.10	21 38.9	12	6 32 47.67	7.165	23 44 43.6	3.69	21 7.5
13	5 4 53.60	7.426	22 59 2.9	11.58	21 37.9	13	6 35 39.44	7.150	23 43 9.3	4.16	21 6.4
14	5 7 51.88	7.423	23 3 34.5	11.05	21 36.9	14	6 38 30.85	7.134	23 41 23.7	4.63	21 5.3
15	5 10 49.90	7.420	23 7 53.4	10.52	21 35.9	15	6 41 21.87	7.118	23 39 27.1	5.09	21 4.2
16	5 13 48.01	+7.416	+23 11 59.7	+ 9.99	21 35.0	16	6 44 12.51	+7.102	+23 37 19.5	- 5.55	21 3.1
17	5 16 45.94	7.411	23 15 53.4	9.47	21 34.0	17	6 47 2.74	7.085	23 35 0.7	6.01	21 2.0
18	5 19 43.74	7.406	23 19 34.4	8.94	21 33.0	18	6 49 52.58	7.068	23 32 31.1	6.46	21 0.9
19	5 22 41.42	7.401	23 23 2.8	8.42	21 32.0	19	6 52 42.00	7.051	23 29 50.7	6.90	20 59.7
20	5 25 38.98	7.395	23 26 18.5	7.89	21 31.0	20	6 55 31.01	7.034	23 26 59.7	7.35	20 58.6
21	5 28 36.40	+7.389	+23 29 21.7	+ 7.37	21 30.0	21	6 58 19.60	+7.016	+23 23 58.0	- 7.79	20 57.4
22	5 31 33.67	7.383	23 32 12.3	6.85	21 29.1	22	7 1 7.76	6.998	23 20 45.8	8.23	20 56.3
23	5 34 30.79	7.377	23 34 50.3	6.33	21 28.1	23	7 3 55.48	6.980	23 17 23.2	8.66	20 55.1
24	5 37 27.76	7.370	23 37 15.9	5.81	21 27.1	24	7 6 42.77	6.961	23 13 50.3	9.09	20 54.0
25	5 40 24.55	7.363	23 39 29.0	5.29	21 26.1	25	7 9 29.61	6.942	23 10 7.1	9.51	20 52.8
26	5 43 21.16	+7.355	+23 41 29.6	+ 4.77	21 25.1	26	7 12 16.00	+6.923	+23 6 13.9	- 9.93	20 51.7
27	5 46 17.59	7.347	23 43 17.7	4.25	21 24.1	27	7 15 1.93	6.904	23 2 10.8	10.34	20 50.5
28	5 49 13.83	7.339	23 44 53.6	3.73	21 23.1	28	7 17 47.41	6.885	22 57 57.8	10.75	20 49.2
29	5 52 9.87	7.331	23 46 17.1	3.22	21 22.1	29	7 20 32.43	6.866	22 53 35.0	11.16	20 48.0
30	5 55 5.70	7.322	23 47 28.2	2.71	21 21.0	30	7 23 16.96	6.846	22 49 2.5	11.56	20 46.8
31	5 58 1.31	+7.312	+23 48 27.1	+ 2.20	21 20.0	31	7 26 1.02	+6.826	+22 44 20.6	-11.95	20 45.6
32	6 0 56.69	+7.302	+23 49 14.0	+ 1.70	21 19.0	32	7 28 44.59	+6.806	+22 39 29.3	-12.33	20 44.4
Day of the Month.						Day of the Month.					
5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th. 29th.					
Semidiameter . . 2.3 2.3 2.3 2.3 2.3 2.3						Semidiameter . . 2.4 2.4 2.4 2.4 2.5 2.5					
Hor. Parallax . . 3.9 4.0 4.0 4.0 4.1 4.1						Hor. Parallax . . 4.1 4.2 4.2 4.2 4.3 4.3					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>	<i>h m</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>	<i>h m</i>
1	7 28 44.59	+6.806	+22 39 29.3	-12.33	20 44.4	1	8 46 14.43	+6.069	+19 11 59.8	-21.40	20 3.4
2	7 31 27.66	6.785	22 34 28.8	12.71	20 43.2	2	8 48 40.26	6.063	19 3 23.7	21.61	20 1.9
3	7 34 10.24	6.763	22 29 19.1	13.09	20 41.9	3	8 51 5.46	6.037	18 54 42.7	21.81	20 0.3
4	7 36 52.29	6.741	22 24 0.4	13.46	20 40.7	4	8 53 30.03	6.010	18 45 56.8	22.01	19 58.8
5	7 39 33.83	6.720	22 18 32.8	13.83	20 39.4	5	8 55 53.95	5.983	18 37 6.4	22.20	19 57.3
6	7 42 14.84	+6.698	+22 12 56.5	-14.19	20 38.2	6	8 58 17.24	+5.957	+18 28 11.3	-22.39	19 55.7
7	7 44 55.33	6.675	22 7 11.5	14.55	20 36.9	7	9 0 39.98	5.930	18 19 11.8	22.56	19 54.2
8	7 47 35.27	6.652	22 1 18.1	14.91	20 35.6	8	9 3 1.87	5.903	18 10 8.3	22.73	19 52.6
9	7 50 14.66	6.629	21 55 16.4	15.25	20 34.3	9	9 5 23.20	5.875	18 1 0.7	22.89	19 51.0
10	7 52 53.49	6.606	21 49 6.5	15.59	20 33.0	10	9 7 43.87	5.848	17 51 49.3	23.05	19 49.4
11	7 55 31.76	+6.583	+21 42 48.4	-15.99	20 31.7	11	9 10 3.88	+5.820	+17 42 34.1	-23.20	19 47.8
12	7 58 9.47	6.559	21 36 22.5	16.24	20 30.4	12	9 12 23.22	5.792	17 33 15.4	23.35	19 46.2
13	8 0 46.61	6.535	21 29 48.7	16.56	20 29.0	13	9 14 41.90	5.764	17 23 53.2	23.49	19 44.5
14	8 3 23.17	6.511	21 23 7.2	16.85	20 27.7	14	9 16 59.91	5.736	17 14 27.7	23.63	19 42.9
15	8 5 59.15	6.487	21 16 18.2	17.19	20 26.3	15	9 19 17.24	5.708	17 4 59.1	23.75	19 41.2
16	8 8 34.55	+6.463	+21 9 21.8	-17.50	20 25.0	16	9 21 33.90	+5.680	+16 55 27.6	-23.87	19 39.5
17	8 11 9.36	6.438	21 2 18.2	17.80	20 23.6	17	9 23 49.88	5.652	16 45 53.2	23.99	19 37.9
18	8 13 43.59	6.414	20 55 7.3	18.10	20 22.2	18	9 26 5.19	5.624	16 36 16.2	24.10	19 36.2
19	8 16 17.22	6.389	20 47 49.5	18.39	20 20.8	19	9 28 19.83	5.596	16 26 36.6	24.20	19 34.4
20	8 18 50.27	6.365	20 40 24.8	18.67	20 19.5	20	9 30 33.80	5.568	16 16 54.5	24.30	19 32.7
21	8 21 22.73	+6.340	+20 32 53.4	-18.95	20 18.1	21	9 32 47.09	+5.540	+16 7 10.3	-24.39	19 31.0
22	8 23 54.60	6.316	20 25 15.4	19.22	20 16.7	22	9 34 59.71	5.511	15 57 23.9	24.47	19 29.2
23	8 26 25.87	6.291	20 17 30.9	19.49	20 15.2	23	9 37 11.65	5.483	15 47 35.5	24.55	19 27.5
24	8 28 56.55	6.267	20 9 40.1	19.75	20 13.8	24	9 39 22.90	5.454	15 37 45.5	24.63	19 25.7
25	8 31 26.63	6.242	20 1 43.1	20.00	20 12.3	25	9 41 33.47	5.426	15 27 53.7	24.68	19 23.9
26	8 33 56.12	+6.217	+19 53 40.1	-20.25	20 10.9	26	9 43 43.36	+5.397	+15 18 0.5	-24.74	19 22.2
27	8 36 25.00	6.191	19 45 31.2	20.49	20 9.4	27	9 45 52.56	5.369	15 8 6.0	24.80	19 20.4
28	8 38 53.28	6.166	19 37 16.6	20.73	20 7.9	28	9 48 1.06	5.340	14 58 10.3	24.84	19 18.6
29	8 41 20.94	6.140	19 28 56.4	20.95	20 6.4	29	9 50 8.86	5.310	14 48 13.7	24.88	19 16.8
30	8 43 47.99	6.115	19 20 30.7	21.18	20 4.9	30	9 52 15.96	5.281	14 38 16.2	24.91	19 14.9
31	8 46 14.43	+6.089	+19 11 59.8	-21.40	20 3.4	31	9 54 22.35	+5.251	+14 28 18.1	-24.93	19 13.1
32	8 48 40.26	+6.063	+19 3 23.7	-21.61	20 1.9	32	9 56 28.01	+5.221	+14 19 19.5	-24.95	19 11.2
Day of the Month.						Day of the Month.					
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22d.						22d.					
23d.						23d.					
24d.						24d.					
25d.						25d.					
26d.						26d.					
27d.						27d.					
28d.						28d.					
29d.						29d.					
30d.						30d.					
31d.						31d.					
Semidiameter . .						Semidiameter . .					
Hor. Parallax . .						Hor. Parallax . .					
2.5						2.8					
4.4						4.8					
2.5						2.8					
4.5						4.9					
2.6						2.9					
4.5						5.0					
2.6						2.9					
4.6						5.2					
2.7						3.0					
4.7						5.3					
2.7						3.1					
4.8						5.4					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	9 56 23.01	+5.381	+14 18 19.5	-24.95	19 11.2	1	10 53 6.59	+4.167	+9 29 26.4	-22.12	18 9.4
2	9 58 32.94	5.190	14 8 20.6	24.96	19 9.4	2	10 54 46.09	4.194	9 20 38.1	21.90	18 7.1
3	10 0 37.13	5.159	13 58 21.6	24.96	19 7.5	3	10 56 24.56	4.081	9 11 55.0	21.68	18 4.8
4	10 2 40.58	5.128	13 48 22.7	24.96	19 5.6	4	10 58 1.99	4.037	9 3 17.4	21.45	18 2.4
5	10 4 43.20	5.097	13 38 24.0	24.94	19 3.7	5	10 50 38.34	3.992	8 54 45.3	21.21	18 0.1
6	10 6 45.24	+5.065	+13 28 25.7	-24.92	19 1.8	6	11 1 13.60	+3.946	+8 46 19.2	-20.96	17 57.7
7	10 8 46.41	5.033	13 18 28.0	24.89	18 59.8	7	11 2 47.75	3.899	8 37 59.1	20.70	17 55.3
8	10 10 46.80	5.000	13 8 31.0	24.85	18 57.9	8	11 4 20.78	3.852	8 29 45.4	20.44	17 52.9
9	10 12 46.41	4.968	12 58 34.9	24.81	18 56.0	9	11 5 52.66	3.804	8 21 38.0	20.16	17 50.5
10	10 14 45.24	4.935	12 48 39.9	24.77	18 54.0	10	11 7 23.38	3.755	8 13 37.4	19.88	17 48.1
11	10 16 43.37	+4.909	+12 38 46.1	-24.71	18 52.0	11	11 8 52.91	+3.705	+8 5 43.7	-19.59	17 45.6
12	10 18 40.50	4.868	12 28 53.8	24.65	18 50.0	12	11 10 21.24	3.655	7 57 57.0	19.30	17 43.1
13	10 20 36.93	4.834	12 19 3.0	24.58	18 48.0	13	11 11 48.36	3.604	7 50 17.5	18.99	17 40.6
14	10 22 32.54	4.800	12 9 13.9	24.51	18 45.9	14	11 13 14.24	3.552	7 42 45.6	18.67	17 38.1
15	10 24 27.34	4.766	11 59 26.7	24.43	18 43.9	15	11 14 38.86	3.499	7 35 21.3	18.35	17 35.6
16	10 26 21.31	+4.731	+11 49 41.5	-24.34	18 41.9	16	11 16 2.21	+3.446	+7 28 4.9	-18.02	17 33.0
17	10 28 14.45	4.697	11 39 58.6	24.24	18 39.8	17	11 17 24.25	3.391	7 20 56.6	17.67	17 30.4
18	10 30 6.76	4.663	11 30 18.0	24.14	18 37.7	18	11 18 44.08	3.336	7 13 56.6	17.32	17 27.8
19	10 31 58.23	4.627	11 20 39.9	24.03	18 35.6	19	11 20 4.37	3.279	7 7 5.1	16.96	17 25.2
20	10 33 48.85	4.591	11 11 4.6	23.91	18 33.5	20	11 21 22.39	3.222	7 0 22.4	16.59	17 22.5
21	10 35 38.61	+4.555	+11 1 32.1	-23.79	18 31.4	21	11 22 39.01	+3.163	+6 53 46.6	-16.21	17 19.8
22	10 37 27.51	4.519	10 52 2.7	23.66	18 29.3	22	11 23 54.22	3.104	6 47 24.0	15.82	17 17.1
23	10 39 15.53	4.482	10 42 36.5	23.52	18 27.1	23	11 25 7.99	3.042	6 41 8.8	15.42	17 14.4
24	10 41 2.67	4.445	10 33 13.7	23.37	18 24.9	24	11 26 20.27	2.980	6 35 3.3	15.02	17 11.6
25	10 42 48.91	4.407	10 23 54.5	23.22	18 22.8	25	11 27 31.04	2.916	6 29 7.7	14.60	17 8.9
26	10 44 34.23	+4.369	+10 14 39.2	-23.06	18 20.6	26	11 28 40.26	+2.851	+6 23 22.4	-14.17	17 6.1
27	10 46 18.62	4.330	10 5 27.8	22.89	18 18.4	27	11 29 47.89	2.784	6 17 47.5	13.73	17 3.2
28	10 48 2.07	4.290	9 56 20.7	22.71	18 16.2	28	11 30 53.91	2.716	6 12 23.4	13.28	17 0.4
29	10 49 44.55	4.250	9 47 17.9	22.52	18 13.9	29	11 31 58.28	2.647	6 7 10.2	12.81	16 57.5
30	10 51 26.07	4.209	9 38 19.7	22.33	18 11.6	30	11 33 0.96	2.575	6 2 8.3	12.34	16 54.6
31	10 53 6.59	+4.167	+ 9 29 26.4	-22.12	18 9.4	31	11 34 1.90	+2.502	+5 57 17.9	-11.85	16 51.7
32	10 54 46.09	+4.124	+ 9 20 38.1	-21.90	18 7.1	32	11 35 1.07	+2.427	+5 52 39.4	-11.35	16 48.7
Day of the Month.						Day of the Month.					
2d. 7th. 12th. 17th. 22d. 27th.						2d. 7th. 12th. 17th. 22d. 27th. 32d.					
Semidiameter . . 3.2 3.3 3.4 3.4 3.6 3.7						Semidiameter . . 3.8 3.9 4.1 4.2 4.4 4.6 4.8					
Hor. Parallax . . 5.5 5.7 5.9 6.0 6.2 6.4						Hor. Parallax . . 6.7 6.9 7.1 7.4 7.7 8.1 8.4					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	"	° ' "	"	h m		h m s	"	° ' "	"	h m
1	10 31 23.45	-0.398	+10 28 26.2	+2.63	15 43.5	1	10 22 5.47	-1.086	+11 29 50.5	+6.75	13 32.2
2	10 31 15.22	0.358	10 29 31.3	2.80	15 39.5	2	10 21 38.92	1.114	11 32 33.3	6.89	13 27.9
3	10 31 6.26	0.398	10 30 40.6	2.97	15 35.4	3	10 21 11.98	1.190	11 35 17.8	6.89	13 23.5
4	10 30 56.60	0.417	10 31 53.9	3.14	15 31.3	4	10 20 44.70	1.144	11 38 3.8	6.95	13 19.1
5	10 30 46.22	0.447	10 33 11.3	3.31	15 27.1	5	10 20 17.09	1.157	11 40 51.2	7.00	13 14.7
6	10 30 35.14	-0.477	+10 34 32.6	+3.47	15 22.9	6	10 19 49.16	-1.170	+11 43 39.9	+7.05	13 10.3
7	10 30 23.35	0.506	10 35 58.0	3.64	15 18.7	7	10 19 20.92	1.182	11 46 20.9	7.10	13 5.9
8	10 30 10.87	0.534	10 37 27.3	3.80	15 14.7	8	10 18 52.41	1.193	11 49 20.8	7.14	13 1.5
9	10 29 57.69	0.563	10 39 0.5	3.96	15 10.6	9	10 18 23.65	1.203	11 52 12.6	7.18	12 57.0
10	10 29 43.83	0.592	10 40 37.5	4.12	15 6.4	10	10 17 54.65	1.213	11 55 5.2	7.21	12 52.6
11	10 29 29.28	-0.620	+10 42 18.3	+4.29	15 2.2	11	10 17 25.42	-1.221	+11 57 58.5	+7.23	12 48.2
12	10 29 14.06	0.648	10 44 2.8	4.43	14 58.0	12	10 16 56.01	1.229	12 0 52.3	7.25	12 43.8
13	10 28 58.16	0.676	10 45 51.0	4.58	14 53.8	13	10 16 26.43	1.236	12 3 46.5	7.26	12 39.4
14	10 28 41.61	0.703	10 47 42.8	4.73	14 49.6	14	10 15 56.70	1.241	12 6 40.9	7.27	12 35.0
15	10 28 24.41	0.729	10 49 38.2	4.87	14 45.4	15	10 15 26.84	1.246	12 9 35.5	7.27	12 30.6
16	10 28 6.50	-0.756	+10 51 36.9	+5.02	14 41.2	16	10 14 56.88	-1.250	+12 12 30.0	+7.27	12 26.2
17	10 27 48.14	0.782	10 53 39.0	5.15	14 36.9	17	10 14 26.84	1.253	12 15 24.4	7.26	12 21.7
18	10 27 29.07	0.807	10 55 44.4	5.29	14 32.6	18	10 13 56.74	1.256	12 18 18.5	7.25	12 17.2
19	10 27 9.41	0.832	10 57 52.9	5.42	14 28.4	19	10 13 26.61	1.257	12 21 12.2	7.23	12 12.8
20	10 26 49.15	0.856	11 0 4.5	5.55	14 24.1	20	10 12 56.47	1.257	12 24 5.3	7.20	12 8.3
21	10 26 28.32	-0.879	+11 2 19.2	+5.67	14 19.8	21	10 12 26.34	-1.256	+12 26 57.7	+7.17	12 3.9
22	10 26 6.93	0.903	11 4 36.8	5.79	14 15.5	22	10 11 56.25	1.253	12 29 49.4	7.13	11 59.4
23	10 25 44.99	0.925	11 6 57.2	5.91	14 11.2	23	10 11 26.21	1.250	12 32 40.0	7.09	11 55.0
24	10 25 22.52	0.947	11 9 20.3	6.02	14 6.9	24	10 10 56.25	1.246	12 35 29.8	7.05	11 50.6
25	10 24 59.54	0.968	11 11 46.0	6.12	14 2.6	25	10 10 26.39	1.242	12 38 18.4	7.00	11 46.2
26	10 24 36.05	-0.989	+11 14 14.2	+6.23	13 58.2	26	10 9 56.66	-1.236	+12 41 5.7	+6.94	11 41.7
27	10 24 12.07	1.009	11 16 44.9	6.32	13 53.9	27	10 9 27.06	1.230	12 43 51.7	6.88	11 37.3
28	10 23 47.63	1.029	11 19 17.8	6.42	13 49.6	28	10 8 57.64	1.223	12 46 36.2	6.80	11 32.9
29	10 23 22.73	1.047	11 21 52.9	6.51	13 45.3	29	10 8 28.38	1.215	12 49 19.1	6.75	11 28.5
30	10 22 57.40	1.064	11 24 30.1	6.59	13 40.9	30	10 7 59.33	1.206	12 52 0.3	6.68	11 24.1
31	10 22 31.63	-1.082	+11 27 9.4	+6.67	13 36.6	31	10 7 30.50	-1.196	+12 54 39.7	+6.60	11 19.7
32	10 22 5.47	-1.098	+11 29 50.5	+6.75	13 32.2	32	10 7 1.92	-1.186	+12 57 17.1	+6.52	11 15.3
Day of the Month.		1st.	11th.	21st.	31st.	Day of the Month.		1st.	11th.	21st.	31st.
Polar Semidiameter . .		19".9	20".4	20".8	21".2	Polar Semidiameter . .		21".2	21".4	21".4	21".3
Horizontal Parallax . .		1.9	1.9	1.9	2.0	Horizontal Parallax . .		2.0	2.0	2.0	2.0

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	" "	h m		h m s	s	° ' "	" "	h m
1	10 8 28.38	-1.215	+12 49 19.1	+6.75	11 28.5	1	9 56 32.92	-0.008	+13 52 7.5	+2.93	9 14.9
2	10 7 50.33	1.206	12 52 0.3	6.68	11 24.1	2	9 56 18.67	0.580	13 53 16.0	2.78	9 10.7
3	10 7 30.50	1.196	12 54 39.7	6.60	11 19.7	3	9 56 5.10	0.552	13 54 20.7	2.62	9 6.6
4	10 7 1.92	1.186	12 57 17.1	6.52	11 15.3	4	9 55 52.19	0.524	13 55 21.7	2.46	9 2.4
5	10 6 33.60	1.175	12 59 52.6	6.44	11 10.9	5	9 55 39.96	0.495	13 56 18.7	2.30	8 58.3
6	10 6 5.56	-1.162	+13 2 26.0	+6.35	11 6.5	6	9 55 28.41	-0.467	+13 57 12.0	+2.14	8 54.2
7	10 5 37.83	1.149	13 4 57.2	6.26	11 2.1	7	9 55 17.55	0.438	13 58 1.5	1.98	8 50.1
8	10 5 10.41	1.136	13 7 36.2	6.16	10 57.7	8	9 55 7.40	0.409	13 58 47.0	1.82	8 46.0
9	10 4 43.32	1.121	13 9 52.7	6.05	10 53.4	9	9 54 57.94	0.379	13 59 28.8	1.66	8 41.9
10	10 4 16.60	1.106	13 12 16.8	5.95	10 49.0	10	9 54 49.19	0.350	14 0 6.7	1.50	8 37.8
11	10 3 50.26	-1.090	+13 14 38.3	+5.84	10 44.6	11	9 54 41.15	-0.320	+14 0 40.7	+1.33	8 33.8
12	10 3 24.31	1.073	13 16 57.0	5.73	10 40.2	12	9 54 33.83	0.290	14 1 10.8	1.17	8 29.8
13	10 2 58.77	1.055	13 19 13.1	5.61	10 35.9	13	9 54 27.22	0.261	14 1 37.0	1.01	8 25.7
14	10 2 33.66	1.037	13 21 26.3	5.49	10 31.6	14	9 54 21.32	0.231	14 1 50.2	0.85	8 21.7
15	10 2 9.01	1.018	13 23 36.6	5.37	10 27.2	15	9 54 16.15	0.200	14 2 17.6	0.68	8 17.7
16	10 1 44.82	-0.998	+13 25 43.9	+5.24	10 22.9	16	9 54 11.72	-0.170	+14 2 32.0	+0.52	8 13.7
17	10 1 21.12	0.977	13 27 48.2	5.12	10 18.6	17	9 54 7.99	0.140	14 2 42.6	0.36	8 9.7
18	10 0 57.92	0.956	13 29 49.4	4.98	10 14.3	18	9 54 5.00	0.109	14 2 49.2	0.20	8 5.7
19	10 0 35.23	0.934	13 31 47.2	4.85	10 10.0	19	9 54 2.74	0.079	14 2 52.0	+0.04	8 1.8
20	10 0 13.08	0.912	13 33 42.0	4.71	10 5.7	20	9 54 1.22	0.049	14 2 50.9	-0.12	7 57.8
21	9 59 51.46	-0.889	+13 35 33.4	+4.57	10 1.4	21	9 54 0.41	-0.019	+14 2 46.0	-0.29	7 53.9
22	9 59 30.41	0.865	13 37 21.4	4.43	9 57.1	22	9 54 0.32	+0.011	14 2 37.2	0.45	7 49.9
23	9 59 9.93	0.842	13 39 6.0	4.29	9 52.8	23	9 54 0.95	0.041	14 2 24.6	0.61	7 46.0
24	9 58 50.03	0.817	13 40 47.1	4.14	9 48.6	24	9 54 2.30	0.071	14 2 8.1	0.76	7 42.1
25	9 58 30.71	0.792	13 42 24.8	4.00	9 44.3	25	9 54 4.37	0.101	14 1 47.9	0.92	7 38.2
26	9 58 12.01	-0.767	+13 43 59.0	+3.85	9 40.1	26	9 54 7.14	+0.130	+14 1 23.9	-1.08	7 34.3
27	9 57 53.92	0.741	13 45 29.6	3.70	9 35.9	27	9 54 10.62	0.160	14 0 56.2	1.23	7 30.4
28	9 57 36.44	0.715	13 46 56.5	3.55	9 31.7	28	9 54 14.81	0.189	14 0 24.6	1.39	7 26.6
29	9 57 19.60	0.689	13 48 19.8	3.39	9 27.5	29	9 54 19.69	0.218	13 59 49.5	1.54	7 22.7
30	9 57 3.39	0.663	13 49 39.4	3.24	9 23.3	30	9 54 25.28	0.247	13 59 10.6	1.70	7 18.9
31	9 56 47.83	-0.635	+13 50 55.4	+3.09	9 19.1	31	9 54 31.56	+0.276	+13 58 28.0	-1.85	7 15.1
32	9 56 32.92	-0.608	+13 52 7.5	+2.93	9 14.9	32	9 54 38.53	+0.305	+13 57 41.8	-2.00	7 11.3
Day of the Month.						Day of the Month.					
	1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.	
Polar Semidiameter . .	21".3	21".1	20".8	20".3	Polar Semidiameter . .	20".2	19".7	19".2	18".6		
Horizontal Parallax . .	2.0	2.0	2.0	1.9	Horizontal Parallax . .	1.9	1.9	1.8	1.8		

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	9 54 31.56	+0.376	+13 58 28.0	-1.85	7 15.1	1	10 3 5.82	+1.067	+13 8 0.0	-6.12	5 21.8
2	9 54 38.53	0.305	13 57 41.8	2.00	7 11.3	2	10 3 31.67	1.088	13 5 31.8	6.23	5 18.3
3	9 54 46.18	0.333	13 56 51.9	2.15	7 7.4	3	10 3 58.02	1.108	13 3 0.7	6.35	5 14.8
4	9 54 54.52	0.362	13 55 58.4	2.31	7 3.7	4	10 4 24.86	1.129	13 0 26.9	6.47	5 11.3
5	9 55 3.54	0.390	13 55 1.3	2.45	6 59.9	5	10 4 52.21	1.150	12 57 50.1	6.59	5 7.8
6	9 55 13.23	+0.418	+13 54 0.7	-2.60	6 56.1	6	10 5 20.06	+1.170	+12 55 10.6	-6.70	5 4.3
7	9 55 23.60	0.446	13 52 56.5	2.75	6 52.4	7	10 5 48.38	1.190	12 52 28.3	6.82	5 0.9
8	9 55 34.64	0.474	13 51 48.6	2.90	6 48.6	8	10 6 17.17	1.210	12 49 43.3	6.94	4 57.4
9	9 55 46.34	0.501	13 50 37.3	3.05	6 44.9	9	10 6 46.45	1.230	12 46 55.5	7.05	4 54.0
10	9 55 58.70	0.528	13 49 22.4	3.19	6 41.2	10	10 7 16.19	1.249	12 44 5.0	7.16	4 50.6
11	9 56 11.71	+0.556	+13 48 4.1	-3.34	6 37.4	11	10 7 46.38	+1.268	+12 41 11.8	-7.28	4 47.1
12	9 56 25.38	0.583	13 46 42.2	3.48	6 33.7	12	10 8 17.03	1.288	12 38 16.0	7.38	4 43.7
13	9 56 39.70	0.610	13 45 16.9	3.63	6 30.0	13	10 8 48.13	1.305	12 35 17.5	7.49	4 40.3
14	9 56 54.65	0.636	13 43 48.3	3.76	6 26.4	14	10 9 19.67	1.323	12 32 16.5	7.60	4 36.9
15	9 57 10.23	0.663	13 42 16.2	3.90	6 22.7	15	10 9 51.62	1.341	12 29 13.0	7.70	4 33.5
16	9 57 26.45	+0.689	+13 40 40.8	-4.05	6 19.0	16	10 10 24.01	+1.358	+12 26 6.9	-7.81	4 30.1
17	9 57 43.30	0.715	13 39 2.0	4.18	6 15.4	17	10 10 56.81	1.376	12 22 58.3	7.91	4 26.7
18	9 58 0.75	0.740	13 37 30.1	4.32	6 11.8	18	10 11 30.03	1.393	12 19 47.2	8.01	4 23.3
19	9 58 18.81	0.765	13 35 34.7	4.46	6 8.1	19	10 12 3.64	1.409	12 16 33.9	8.11	4 20.0
20	9 58 37.48	0.790	13 33 46.1	4.59	6 4.5	20	10 12 37.64	1.425	12 13 18.0	8.21	4 16.6
21	9 58 56.74	+0.815	+13 31 54.2	-4.73	6 0.9	21	10 13 12.05	+1.441	+12 9 59.7	-8.31	4 13.2
22	9 59 16.57	0.839	13 29 59.2	4.86	5 57.3	22	10 13 46.83	1.457	12 6 39.1	8.41	4 9.8
23	9 59 36.99	0.863	13 28 1.0	4.99	5 53.7	23	10 14 21.97	1.473	12 3 16.3	8.50	4 6.5
24	9 59 57.99	0.887	13 25 59.7	5.12	5 50.1	24	10 14 57.49	1.488	11 59 51.1	8.60	4 3.1
25	10 0 19.57	0.910	13 23 55.3	5.25	5 46.5	25	10 15 33.37	1.503	11 56 23.6	8.69	3 59.8
26	10 0 41.70	+0.934	+13 21 47.8	-5.37	5 43.0	26	10 16 9.61	+1.517	+11 52 53.9	-8.78	3 56.5
27	10 1 4.37	0.957	13 19 37.3	5.50	5 39.4	27	10 16 46.18	1.531	11 49 22.1	8.88	3 53.2
28	10 1 27.60	0.979	13 17 23.8	5.63	5 35.8	28	10 17 23.11	1.546	11 45 48.0	8.97	3 49.9
29	10 1 51.37	1.001	13 15 7.2	5.75	5 32.3	29	10 18 0.38	1.560	11 42 11.7	9.06	3 46.6
30	10 2 15.67	1.023	13 12 47.7	5.87	5 28.8	30	10 18 37.98	1.573	11 38 33.3	9.15	3 43.3
31	10 2 40.48	+1.045	+13 10 25.4	-6.00	5 25.3	31	10 19 15.89	+1.587	+11 34 52.8	-9.23	3 40.0
32	10 3 5.82	+1.067	+13 8 0.0	-6.12	5 21.8	32	10 19 54.13	+1.600	+11 31 10.2	-9.32	3 36.7
Day of the Month.		1st.	11th.	21st.	31st.	Day of the Month.		1st.	11th.	21st.	31st.
Polar Semidiameter . .		18.6	18.1	17.5	17.0	Polar Semidiameter . .		17.0	16.5	16.1	15.8
Horizontal Parallax . .		1.8	1.7	1.6	1.6	Horizontal Parallax . .		1.6	1.6	1.5	1.5

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.



## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	10 19 15.89	+1.587	+11 34 52.8	-9.23	3 40.0	1	10 41 3.72	+1.883	+9 25 48.0	-11.41	1 59.8
2	10 19 54.13	1.600	11 31 10.2	9.38	3 36.7	2	10 41 49.21	1.899	9 21 13.7	11.46	1 56.6
3	10 20 32.68	1.613	11 27 25.6	9.41	3 33.4	3	10 42 34.86	1.905	9 16 38.1	11.51	1 53.4
4	10 21 11.56	1.626	11 23 38.7	9.49	3 30.1	4	10 43 20.67	1.919	9 12 1.3	11.56	1 50.2
5	10 21 50.73	1.639	11 19 49.9	9.57	3 26.8	5	10 44 6.63	1.918	9 7 23.3	11.61	1 47.1
6	10 22 30.21	+1.651	+11 15 59.2	-9.66	3 23.5	6	10 44 52.72	+1.923	+9 2 44.2	-11.66	1 43.9
7	10 23 10.00	1.664	11 12 6.4	9.74	3 20.2	7	10 45 38.95	1.929	8 58 3.9	11.70	1 40.8
8	10 23 50.07	1.675	11 8 11.6	9.83	3 16.9	8	10 46 25.32	1.935	8 53 22.4	11.74	1 37.6
9	10 24 30.41	1.687	11 4 15.0	9.90	3 13.7	9	10 47 11.82	1.940	8 48 39.9	11.79	1 34.4
10	10 25 11.04	1.699	11 0 16.6	9.98	3 10.4	10	10 47 58.43	1.945	8 43 56.3	11.84	1 31.3
11	10 25 51.93	+1.710	+10 56 16.2	-10.05	3 7.2	11	10 48 45.17	+1.950	+8 39 11.8	-11.89	1 28.1
12	10 26 33.11	1.721	10 52 14.0	10.13	3 3.9	12	10 49 32.02	1.955	8 34 26.1	11.92	1 25.0
13	10 27 14.53	1.732	10 48 10.0	10.20	3 0.7	13	10 50 18.98	1.959	8 29 39.5	11.96	1 21.8
14	10 27 56.22	1.743	10 44 4.2	10.28	2 57.4	14	10 51 6.03	1.963	8 24 52.0	12.00	1 18.7
15	10 28 38.16	1.753	10 39 56.6	10.35	2 54.2	15	10 51 53.18	1.967	8 20 3.8	12.04	1 15.5
16	10 29 20.34	+1.763	+10 35 47.3	-10.42	2 51.0	16	10 52 40.43	+1.971	+8 15 14.6	-12.07	1 12.4
17	10 30 2.75	1.772	10 31 36.4	10.49	2 47.7	17	10 53 27.77	1.974	8 10 24.6	12.10	1 9.2
18	10 30 45.39	1.782	10 27 23.9	10.56	2 44.5	18	10 54 15.18	1.977	8 5 33.7	12.13	1 6.1
19	10 31 28.26	1.791	10 23 9.6	10.63	2 41.3	19	10 55 2.67	1.981	8 0 42.1	12.17	1 2.9
20	10 32 11.36	1.800	10 18 53.7	10.69	2 38.1	20	10 55 50.24	1.984	7 55 49.7	12.20	0 59.8
21	10 32 54.66	+1.809	+10 14 36.3	-10.76	2 34.9	21	10 56 37.88	+1.987	+7 50 56.6	-12.24	0 56.6
22	10 33 38.17	1.817	10 10 17.4	10.82	2 31.7	22	10 57 25.58	1.989	7 46 2.9	12.26	0 53.5
23	10 34 21.89	1.826	10 5 56.8	10.89	2 28.5	23	10 58 13.34	1.991	7 41 8.5	12.28	0 50.3
24	10 35 5.81	1.834	10 1 34.6	10.95	2 25.3	24	10 59 1.17	1.994	7 36 13.4	12.31	0 47.2
25	10 35 49.91	1.842	9 57 11.3	11.01	2 22.1	25	10 59 49.05	1.997	7 31 17.7	12.33	0 44.1
26	10 36 34.21	+1.850	+ 9 52 46.5	-11.07	2 18.9	26	11 0 36.97	+1.998	+7 26 21.4	-12.35	0 41.0
27	10 37 18.69	1.857	9 48 20.2	11.13	2 15.7	27	11 1 24.94	2.000	7 21 24.7	12.38	0 37.8
28	10 38 3.36	1.865	9 43 52.4	11.18	2 12.5	28	11 2 12.96	2.002	7 16 27.4	12.40	0 34.7
29	10 38 48.19	1.872	9 39 23.3	11.24	2 9.3	29	11 3 1.02	2.003	7 11 29.6	12.42	0 31.6
30	10 39 33.20	1.879	9 34 52.9	11.30	2 6.1	30	11 3 49.10	2.004	7 6 31.3	12.44	0 28.4
31	10 40 18.38	+1.886	+ 9 30 21.1	-11.35	2 2.9	31	11 4 37.22	+2.006	+7 1 32.6	-12.46	0 25.3
32	10 41 3.72	+1.893	+ 9 25 48.0	-11.41	1 59.8	32	11 5 25.38	+2.007	+6 56 33.4	-12.47	0 22.1
Day of the Month.	1st.	11th.	21st.	31st.		Day of the Month.	1st.	11th.	21st.	31st.	
Polar Semidiameter . .	15".8	15".5	15".2	15".0		Polar Semidiameter . .	15".0	14".8	14".7	14".6	
Horizontal Parallax . .	1.5	1.5	1.4	1.4		Horizontal Parallax . .	1.4	1.4	1.4	1.4	

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> ' "	"	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> ' "	"	<sup>h</sup> <sup>m</sup>
1	11 5 25.38	+2.007	+6 56 33.4	-12.47	0 22.1	1	11 29 21.11	+1.954	+4 26 31.3	-12.33	22 44.8
2	11 6 13.56	2.008	6 51 33.9	12.49	0 19.0	2	11 30 7.95	1.950	4 21 35.8	12.30	22 41.7
3	11 7 1.76	2.008	6 46 34.0	12.50	0 15.8	3	11 30 54.69	1.945	4 16 40.9	12.27	22 38.5
4	11 7 49.97	2.009	6 41 33.8	12.51	0 12.7	4	11 31 41.32	1.940	4 11 46.7	12.24	22 35.4
5	11 8 38.20	2.010	6 36 33.4	12.53	0 9.6	5	11 32 27.83	1.935	4 6 53.2	12.21	22 32.2
6	11 9 26.44	+2.010	+6 31 32.7	-12.54	0 6.5	6	11 33 14.20	+1.930	+4 2 0.6	-12.18	22 29.1
7	11 10 14.67	2.010	6 26 31.7	12.55	0 3.3	7	11 34 0.45	1.924	3 57 8.7	12.14	22 25.9
8	11 11 2.90	2.010	6 21 30.5	12.56	0 0.2	8	11 34 46.57	1.918	3 52 17.6	12.11	22 22.7
9	11 11 51.13	2.009	6 16 29.2	12.56	23 53.9	9	11 35 32.55	1.912	3 47 27.5	12.07	22 19.6
10	11 12 39.35	2.009	6 11 27.8	12.56	23 50.8	10	11 36 18.37	1.906	3 42 38.3	12.03	22 16.4
11	11 13 27.54	+2.007	+6 6 26.3	-12.56	23 47.6	11	11 37 4.04	+1.900	+3 37 50.1	-11.99	22 13.2
12	11 14 15.71	2.007	6 1 24.8	12.56	23 44.5	12	11 37 49.56	1.893	3 33 2.9	11.95	22 10.0
13	11 15 3.86	2.006	5 56 23.3	12.56	23 41.4	13	11 38 34.91	1.886	3 28 16.7	11.90	22 6.8
14	11 15 51.98	2.004	5 51 21.8	12.56	23 38.2	14	11 39 20.09	1.879	3 23 31.6	11.86	22 3.6
15	11 16 40.06	2.002	5 46 20.3	12.56	23 35.1	15	11 40 5.10	1.872	3 18 47.6	11.81	22 0.4
16	11 17 28.09	+2.001	+5 41 19.0	-12.55	23 32.0	16	11 40 49.93	+1.864	+3 14 4.8	-11.76	21 57.3
17	11 18 16.09	1.999	5 36 17.7	12.55	23 28.9	17	11 41 34.58	1.855	3 9 23.1	11.70	21 54.0
18	11 19 4.03	1.997	5 31 16.6	12.54	23 25.8	18	11 42 19.04	1.848	3 4 42.8	11.65	21 50.9
19	11 19 51.93	1.995	5 26 15.7	12.53	23 22.6	19	11 43 3.31	1.840	3 0 3.7	11.60	21 47.7
20	11 20 39.76	1.992	5 21 15.1	12.52	23 19.5	20	11 43 47.38	1.832	2 55 25.9	11.55	21 44.4
21	11 21 27.54	+1.989	+5 16 14.7	-12.51	23 16.3	21	11 44 31.26	+1.823	+2 50 49.4	-11.49	21 41.2
22	11 22 15.25	1.986	5 11 14.6	12.50	23 13.2	22	11 45 14.92	1.815	2 46 14.4	11.43	21 38.0
23	11 23 2.89	1.984	5 6 14.8	12.48	23 10.0	23	11 45 58.37	1.806	2 41 40.7	11.37	21 34.8
24	11 23 50.46	1.981	5 1 15.4	12.47	23 6.9	24	11 46 41.61	1.797	2 37 8.5	11.31	21 31.5
25	11 24 37.95	1.977	4 56 16.3	12.45	23 3.7	25	11 47 24.64	1.788	2 32 37.8	11.25	21 28.3
26	11 25 25.36	+1.973	+4 51 17.6	-12.44	23 0.6	26	11 48 7.43	+1.778	+2 28 8.7	-11.19	21 25.1
27	11 26 12.70	1.970	4 46 19.3	12.42	22 57.4	27	11 48 50.01	1.769	2 23 41.1	11.13	21 21.9
28	11 26 59.94	1.967	4 41 21.5	12.40	22 54.3	28	11 49 32.35	1.759	2 19 15.1	11.05	21 18.7
29	11 27 47.09	1.963	4 36 24.2	12.38	22 51.1	29	11 50 14.44	1.749	2 14 50.7	10.98	21 15.5
30	11 28 34.15	1.958	4 31 27.4	12.35	22 48.0	30	11 50 56.29	1.739	2 10 28.1	10.91	21 12.2
31	11 29 21.11	+1.954	+4 26 31.3	-12.33	22 44.8	31	11 51 37.89	+1.728	+2 6 7.2	-10.84	21 9.0
32	11 30 7.95	+1.950	+4 21 35.8	-12.30	22 41.7	32	11 52 19.23	+1.717	+2 1 48.0	-10.78	21 5.7
Day of the Month.		1st.	11th.	21st.	31st.	Day of the Month.		1st.	11th.	21st.	31st.
Polar Semidiameter . .		14.6	14.6	14.7	14.8	Polar Semidiameter . .		14.8	14.9	15.1	15.3
Horizontal Parallax . .		1.4	1.4	1.4	1.4	Horizontal Parallax . .		1.4	1.4	1.4	1.4

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	11 52 19.23	+1.717	+2 1 48.0	-10.78	21 5.7	1	12 10 28.61	+1.971	+0 9 35.1	-7.68	19 25.6
2	11 53 0.31	1.706	1 57 30.6	10.68	21 2.4	2	12 10 58.90	1.959	0 6 32.4	7.54	19 22.2
3	11 53 41.11	1.694	1 53 15.2	10.60	20 59.1	3	12 11 28.72	1.933	0 3 32.8	7.41	19 18.8
4	11 54 21.64	1.683	1 49 1.6	10.53	20 55.9	4	12 11 58.07	1.913	+0 0 36.4	7.28	19 15.3
5	11 55 1.89	1.671	1 44 50.0	10.44	20 52.6	5	12 12 26.93	1.199	-0 2 16.7	7.14	19 11.9
6	11 55 41.85	+1.658	+1 40 40.4	-10.36	20 49.3	6	12 12 55.31	+1.179	-0 5 6.6	-7.01	19 8.4
7	11 56 21.50	1.646	1 36 32.8	10.27	20 46.0	7	12 13 23.21	1.159	0 7 53.1	6.87	19 4.9
8	11 57 0.86	1.633	1 32 27.4	10.18	20 42.8	8	12 13 50.60	1.131	0 10 36.2	6.72	19 1.4
9	11 57 39.91	1.620	1 28 24.1	10.09	20 39.5	9	12 14 17.50	1.110	0 13 15.8	6.58	18 57.9
10	11 58 18.64	1.607	1 24 22.9	10.00	20 36.2	10	12 14 43.89	1.089	0 15 52.0	6.44	18 54.5
11	11 58 57.04	+1.593	+1 20 24.0	-9.91	20 32.9	11	12 15 9.76	+1.067	-0 18 24.7	-6.30	18 51.0
12	11 59 35.13	1.580	1 16 27.3	9.81	20 29.6	12	12 15 35.11	1.045	0 20 53.9	6.14	18 47.5
13	12 0 12.88	1.566	1 12 32.9	9.71	20 26.3	13	12 15 59.92	1.023	0 23 19.5	5.99	18 43.9
14	12 0 50.29	1.551	1 8 40.9	9.62	20 23.0	14	12 16 24.20	1.000	0 25 41.4	5.84	18 40.4
15	12 1 27.34	1.537	1 4 51.3	9.52	20 19.7	15	12 16 47.94	0.978	0 27 59.7	5.68	18 36.8
16	12 2 4.05	+1.522	+1 1 4.1	-9.41	20 16.4	16	12 17 11.14	+0.955	-0 30 14.3	-5.53	18 33.2
17	12 2 40.41	1.507	0 57 19.4	9.31	20 13.0	17	12 17 33.77	0.939	0 32 25.3	5.37	18 29.6
18	12 3 16.40	1.492	0 53 37.1	9.20	20 9.7	18	12 17 55.85	0.908	0 34 32.4	5.22	18 26.1
19	12 3 52.03	1.476	0 49 57.5	9.10	20 6.3	19	12 18 17.37	0.884	0 36 35.7	5.06	18 22.5
20	12 4 27.28	1.461	0 46 20.4	8.99	20 3.0	20	12 18 38.32	0.861	0 38 35.2	4.89	18 18.9
21	12 5 2.15	+1.445	+0 42 46.0	-8.88	19 59.6	21	12 18 58.69	+0.837	-0 40 30.8	-4.73	18 15.3
22	12 5 36.64	1.429	0 39 14.2	8.77	19 56.2	22	12 19 18.49	0.813	0 42 22.5	4.57	18 11.7
23	12 6 10.73	1.412	0 35 45.1	8.65	19 52.8	23	12 19 37.70	0.788	0 44 10.4	4.41	18 8.1
24	12 6 44.42	1.396	0 32 18.8	8.54	19 49.5	24	12 19 56.32	0.763	0 45 54.2	4.25	18 4.5
25	12 7 17.72	1.378	0 28 55.3	8.42	19 46.1	25	12 20 14.33	0.738	0 47 34.0	4.08	18 0.8
26	12 7 50.60	+1.361	+0 25 34.5	-8.30	19 42.7	26	12 20 31.74	+0.713	-0 49 9.8	-3.91	17 57.2
27	12 8 23.07	1.344	0 22 16.7	8.18	19 39.3	27	12 20 48.54	0.687	0 50 41.5	3.74	17 53.6
28	12 8 55.11	1.326	0 19 1.8	8.06	19 35.9	28	12 21 4.71	0.661	0 52 9.1	3.56	17 49.9
29	12 9 26.71	1.308	0 15 49.8	7.93	19 32.4	29	12 21 20.26	0.635	0 53 32.5	3.39	17 46.2
30	12 9 57.88	1.289	0 12 40.9	7.81	19 29.0	30	12 21 35.18	0.608	0 54 51.8	3.21	17 42.5
31	12 10 28.61	+1.271	+0 9 35.1	-7.68	19 25.6	31	12 21 49.46	+0.583	-0 56 6.9	-3.04	17 38.8
32	12 10 58.90	+1.252	+0 6 32.4	-7.54	19 22.2	32	12 22 3.10	+0.555	-0 57 17.7	-2.86	17 35.1
Day of the Month.						Day of the Month.					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter . .						Polar Semidiameter . .					
Horizontal Parallax . .						Horizontal Parallax . .					
15.3 1.4						16.4 1.5					
15.7 1.5						16.8 1.6					
16.0 1.5						17.3 1.6					
16.4 1.5						17.8 1.7					

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	5 13 18.59	-0.783	+21 34 36.9	-0.48	10 26.3	1	5 6 14.31	-0.309	+21 32 7.9	+0.15	8 17.4
2	5 12 59.92	0.773	21 34 25.6	0.47	10 22.0	2	5 6 7.13	0.290	21 32 12.0	0.18	8 13.4
3	5 12 41.50	0.763	21 34 14.5	0.45	10 17.8	3	5 6 0.41	0.270	21 32 16.6	0.20	8 9.3
4	5 12 23.32	0.752	21 34 3.7	0.44	10 13.5	4	5 5 54.15	0.251	21 32 21.9	0.23	8 5.3
5	5 12 5.41	0.740	21 33 53.3	0.43	10 9.3	5	5 5 48.35	0.232	21 32 27.8	0.26	8 1.2
6	5 11 47.78	-0.738	+21 33 43.2	-0.41	10 5.1	6	5 5 43.02	-0.212	+21 32 34.2	+0.29	7 57.2
7	5 11 30.43	0.716	21 33 33.6	0.39	10 0.9	7	5 5 38.17	0.192	21 32 41.6	0.31	7 53.2
8	5 11 13.37	0.704	21 33 24.2	0.38	9 56.7	8	5 5 33.80	0.173	21 32 49.5	0.34	7 49.2
9	5 10 56.62	0.692	21 33 15.3	0.36	9 52.5	9	5 5 29.89	0.153	21 32 58.0	0.37	7 45.2
10	5 10 40.19	0.678	21 33 6.8	0.34	9 48.3	10	5 5 26.47	0.132	21 33 7.2	0.39	7 41.3
11	5 10 24.08	-0.664	+21 32 58.8	-0.33	9 44.1	11	5 5 23.53	-0.112	+21 33 17.0	+0.42	7 37.3
12	5 10 8.29	0.650	21 32 51.2	0.31	9 39.9	12	5 5 21.08	0.090	21 33 27.4	0.45	7 33.3
13	5 9 52.85	0.636	21 32 44.0	0.29	9 35.7	13	5 5 19.11	0.072	21 33 38.5	0.48	7 29.3
14	5 9 37.77	0.621	21 32 37.3	0.27	9 31.5	14	5 5 17.62	0.052	21 33 50.3	0.50	7 25.4
15	5 9 23.05	0.606	21 32 31.0	0.25	9 27.4	15	5 5 16.63	0.031	21 34 2.7	0.53	7 21.4
16	5 9 8.69	-0.591	+21 32 25.2	-0.23	9 23.2	16	5 5 16.12	-0.011	+21 34 15.8	+0.56	7 17.5
17	5 8 54.71	0.575	21 32 20.0	0.21	9 19.0	17	5 5 16.09	+0.009	21 34 29.5	0.58	7 13.6
18	5 8 41.12	0.558	21 32 15.2	0.19	9 14.9	18	5 5 16.56	0.030	21 34 43.9	0.61	7 9.7
19	5 8 27.91	0.542	21 32 11.0	0.17	9 10.7	19	5 5 17.52	0.050	21 34 58.9	0.64	7 5.7
20	5 8 15.09	0.526	21 32 7.2	0.14	9 6.6	20	5 5 18.96	0.070	21 35 14.5	0.66	7 1.8
21	5 8 2.68	-0.509	+21 32 4.1	-0.12	9 2.4	21	5 5 20.89	+0.091	+21 35 30.8	+0.69	6 57.9
22	5 7 50.68	0.491	21 32 1.5	0.10	8 58.3	22	5 5 23.31	0.111	21 35 47.7	0.72	6 54.1
23	5 7 39.10	0.474	21 31 59.5	0.07	8 54.2	23	5 5 26.21	0.131	21 36 5.2	0.74	6 50.2
24	5 7 27.93	0.456	21 31 58.0	0.05	8 50.1	24	5 5 29.60	0.151	21 36 23.4	0.77	6 46.3
25	5 7 17.19	0.438	21 31 57.2	-0.02	8 46.0	25	5 5 33.46	0.171	21 36 42.1	0.79	6 42.4
26	5 7 6.88	-0.420	+21 31 56.9	0.00	8 41.9	26	5 5 37.81	+0.191	+21 37 1.5	+0.82	6 38.6
27	5 6 57.01	0.402	21 31 57.2	+0.02	8 37.8	27	5 5 42.63	0.211	21 37 21.4	0.84	6 34.7
28	5 6 47.58	0.384	21 31 58.1	0.05	8 33.7	28	5 5 47.92	0.230	21 37 41.9	0.87	6 30.9
29	5 6 38.59	0.365	21 31 59.6	0.08	8 29.6	29	5 5 53.69	0.250	21 38 3.0	0.89	6 27.0
30	5 6 30.05	0.347	21 32 1.8	0.10	8 25.5	30	5 5 59.93	0.270	21 38 24.6	0.91	6 23.2
31	5 6 21.95	-0.328	+21 32 4.5	+0.13	8 21.5	31	5 6 6.64	+0.289	+21 38 46.8	+0.94	6 19.4
32	5 6 14.31	-0.309	+21 32 7.9	+0.15	8 17.4	32	5 6 13.82	+0.309	+21 39 9.6	+0.96	6 15.6
Day of the Month.	1st.	11th.	21st.	31st.		Day of the Month.	1st.	11th.	21st.	31st.	
Polar Semidiameter . .	9.6	9.5	9.4	9.3		Polar Semidiameter . .	9.3	9.1	9.0	8.8	
Horizontal Parallax . .	1.1	1.1	1.1	1.1		Horizontal Parallax . .	1.0	1.0	1.0	1.0	

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.								
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m							
1	5 5 53.60	+0.250	+21 38 3.0	+0.89	6 27.0	1	5 12 33.97	+0.803	+21 52 46.4	+1.40	4 31.9						
2	5 5 59.93	0.270	21 38 24.6	0.91	6 23.2	2	5 12 53.42	0.818	21 53 20.1	1.41	4 29.2						
3	5 6 6.64	0.289	21 38 46.8	0.94	6 19.4	3	5 13 13.23	0.833	21 53 54.0	1.42	4 24.6						
4	5 6 13.82	0.309	21 39 9.6	0.96	6 15.6	4	5 13 33.39	0.847	21 54 28.1	1.42	4 21.0						
5	5 6 21.47	0.326	21 39 32.9	0.98	6 11.8	5	5 13 53.91	0.862	21 55 2.3	1.43	4 17.4						
6	5 6 29.58	+0.348	+21 39 56.8	+1.00	6 8.0	6	5 14 14.78	+0.877	+21 55 36.6	+1.43	4 13.9						
7	5 6 38.15	0.367	21 40 21.1	1.02	6 4.2	7	5 14 36.00	0.891	21 56 11.1	1.44	4 10.3						
8	5 6 47.18	0.386	21 40 46.0	1.05	6 0.4	8	5 14 57.56	0.905	21 56 45.6	1.44	4 6.7						
9	5 6 56.66	0.405	21 41 11.4	1.07	5 56.6	9	5 15 19.46	0.919	21 57 20.3	1.44	4 3.2						
10	5 7 6.61	0.424	21 41 37.3	1.09	5 52.9	10	5 15 41.70	0.934	21 57 55.0	1.45	3 59.6						
11	5 7 17.00	+0.443	+21 42 3.6	+1.11	5 49.1	11	5 16 4.27	+0.947	+21 58 29.8	+1.45	3 56.0						
12	5 7 27.84	0.461	21 42 30.4	1.13	5 45.4	12	5 16 27.16	0.960	21 59 4.6	1.45	3 52.5						
13	5 7 39.14	0.480	21 42 57.7	1.15	5 41.6	13	5 16 50.37	0.974	21 50 39.5	1.45	3 48.9						
14	5 7 50.88	0.498	21 43 25.4	1.16	5 37.9	14	5 17 13.91	0.987	22 0 14.4	1.45	3 45.4						
15	5 8 3.06	0.517	21 43 53.6	1.18	5 34.2	15	5 17 37.76	1.000	22 0 49.3	1.45	3 41.9						
16	5 8 15.68	+0.535	+21 44 22.1	+1.20	5 30.5	16	5 18 1.91	+1.012	+22 1 24.1	+1.45	3 38.3						
17	5 8 28.74	0.553	21 44 51.1	1.21	5 26.7	17	5 18 26.36	1.025	22 1 59.0	1.45	3 34.8						
18	5 8 42.23	0.571	21 45 20.5	1.23	5 23.0	18	5 18 51.11	1.037	22 2 33.8	1.45	3 31.3						
19	5 8 56.14	0.589	21 45 50.3	1.25	5 19.3	19	5 19 16.15	1.049	22 3 8.6	1.45	3 27.8						
20	5 9 10.47	0.606	21 46 20.5	1.26	5 15.6	20	5 19 41.47	1.061	22 3 43.3	1.44	3 24.3						
21	5 9 25.23	+0.624	+21 46 51.0	+1.28	5 11.9	21	5 20 7.07	+1.073	+22 4 17.9	+1.44	3 20.8						
22	5 9 40.41	0.641	21 47 21.9	1.29	5 8.3	22	5 20 32.95	1.084	22 4 52.5	1.44	3 17.2						
23	5 9 55.99	0.658	21 47 53.1	1.31	5 4.6	23	5 20 59.10	1.095	22 5 26.9	1.43	3 13.7						
24	5 10 11.98	0.675	21 48 24.6	1.32	5 1.0	24	5 21 25.51	1.106	22 6 1.2	1.43	3 10.2						
25	5 10 28.37	0.692	21 48 56.4	1.33	4 57.3	25	5 21 52.18	1.117	22 6 35.4	1.42	3 6.7						
26	5 10 45.16	+0.708	+21 49 28.5	+1.34	4 53.7	26	5 22 19.12	+1.127	+22 7 9.5	+1.42	3 3.3						
27	5 11 2.34	0.724	21 50 0.9	1.35	4 50.0	27	5 22 46.30	1.138	22 7 43.4	1.41	2 59.8						
28	5 11 19.90	0.740	21 50 33.5	1.37	4 46.3	28	5 23 13.72	1.148	22 8 17.1	1.40	2 56.3						
29	5 11 37.85	0.756	21 51 6.4	1.38	4 42.7	29	5 23 41.39	1.158	22 8 50.6	1.39	2 52.8						
30	5 11 56.19	0.771	21 51 39.5	1.38	4 39.1	30	5 24 9.29	1.168	22 9 24.0	1.39	2 49.4						
31	5 12 14.89	+0.787	+21 52 12.8	+1.39	4 35.5	31	5 24 37.43	+1.177	+22 9 57.2	+1.38	2 45.9						
32	5 12 33.97	+0.803	+21 52 46.4	+1.40	4 31.9	32	5 25 5.79	+1.186	+22 10 30.1	+1.37	2 42.5						
Day of the Month.					1st.	11th.	21st.	31st.	Day of the Month.					1st.	11th.	21st.	31st.
Polar Semidiameter . .					8".8	8".6	8".5	8".3	Polar Semidiameter . .					8".3	8".2	8".1	8".0
Horizontal Parallax . .					1.0	1.0	1.0	0.9	Horizontal Parallax . .					0.9	0.9	0.9	0.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			h m s	s	° ' "	"	
1	5 24 37.43	+1.177	+22 9 57.2	+1.38	2 45.9	1	5 40 39.61	+1.377	+22 24 25.7	+0.90	1 0.0
2	5 25 5.79	1.186	22 10 30.1	1.37	2 42.5	2	5 41 12.71	1.381	22 24 47.1	0.88	0 56.6
3	5 25 34.37	1.196	22 11 2.8	1.36	2 39.0	3	5 41 45.88	1.384	22 25 7.9	0.86	0 53.2
4	5 26 3.18	1.205	22 11 35.2	1.35	2 35.5	4	5 42 19.13	1.387	22 25 28.3	0.84	0 49.8
5	5 26 32.20	1.214	22 12 7.4	1.34	2 32.1	5	5 42 52.45	1.390	22 25 48.2	0.82	0 46.5
6	5 27 1.43	+1.222	+22 12 39.3	+1.32	2 28.6	6	5 43 25.84	+1.392	+22 26 7.6	+0.80	0 43.1
7	5 27 30.86	1.231	22 13 11.0	1.31	2 25.2	7	5 43 59.28	1.395	22 26 26.4	0.78	0 39.7
8	5 28 0.50	1.239	22 13 42.4	1.30	2 21.8	8	5 44 32.78	1.397	22 26 44.8	0.75	0 36.4
9	5 28 30.34	1.247	22 14 13.5	1.29	2 18.3	9	5 45 6.34	1.399	22 27 2.6	0.73	0 33.0
10	5 29 0.37	1.255	22 14 44.3	1.28	2 14.9	10	5 45 39.95	1.401	22 27 19.9	0.71	0 29.6
11	5 29 30.59	+1.263	+22 15 14.7	+1.26	2 11.4	11	5 46 13.59	+1.403	+22 27 36.7	+0.69	0 26.2
12	5 30 0.99	1.271	22 15 44.8	1.25	2 8.0	12	5 46 47.27	1.404	22 27 53.0	0.67	0 22.9
13	5 30 31.57	1.278	22 16 14.6	1.23	2 4.6	13	5 47 20.98	1.405	22 28 8.8	0.65	0 19.5
14	5 31 2.32	1.285	22 16 44.0	1.22	2 1.2	14	5 47 54.72	1.406	22 28 24.0	0.62	0 16.1
15	5 31 33.24	1.292	22 17 13.1	1.20	1 57.7	15	5 48 28.48	1.407	22 28 38.7	0.60	0 12.7
16	5 32 4.32	+1.298	+22 17 41.9	+1.19	1 54.3	16	5 49 2.26	+1.408	+22 28 52.9	+0.58	0 9.4
17	5 32 35.56	1.305	22 18 10.3	1.17	1 50.9	17	5 49 36.06	1.408	22 29 6.5	0.56	0 6.0
18	5 33 6.95	1.311	22 18 38.3	1.16	1 47.5	18	5 50 9.86	1.408	22 29 19.6	0.54	0 2.6
19	5 33 38.49	1.317	22 19 5.9	1.14	1 44.1	19	5 50 43.66	1.408	22 29 32.2	0.51	0 0.0
20	5 34 10.17	1.323	22 19 33.1	1.13	1 40.7	20	5 51 17.45	1.408	22 29 44.2	0.49	23 52.5
21	5 34 41.99	+1.328	+22 19 59.9	+1.11	1 37.3	21	5 51 51.24	+1.408	+22 29 55.7	+0.47	23 49.1
22	5 35 13.93	1.334	22 20 26.3	1.09	1 33.9	22	5 52 25.02	1.407	22 30 6.7	0.45	23 45.7
23	5 35 46.00	1.339	22 20 52.3	1.07	1 30.5	23	5 52 58.77	1.406	22 30 17.1	0.42	23 42.4
24	5 36 18.20	1.344	22 21 17.8	1.06	1 27.1	24	5 53 32.51	1.405	22 30 27.0	0.40	23 39.0
25	5 36 50.51	1.349	22 21 42.0	1.04	1 23.7	25	5 54 6.23	1.404	22 30 36.4	0.38	23 35.6
26	5 37 22.93	+1.353	+22 22 7.6	+1.02	1 20.3	26	5 54 39.92	+1.403	+22 30 45.2	+0.36	23 32.2
27	5 37 55.46	1.358	22 22 31.8	1.00	1 16.9	27	5 55 13.57	1.401	22 30 53.5	0.33	23 28.9
28	5 38 28.10	1.363	22 22 55.5	0.98	1 13.5	28	5 55 47.18	1.400	22 31 1.2	0.31	23 25.5
29	5 39 0.84	1.367	22 23 18.8	0.96	1 10.1	29	5 56 20.76	1.398	22 31 8.4	0.29	23 22.1
30	5 39 33.67	1.370	22 23 41.6	0.94	1 6.7	30	5 56 54.29	1.397	22 31 15.0	0.27	23 18.7
31	5 40 6.59	+1.374	+22 24 3.9	+0.92	1 3.3	31	5 57 27.77	+1.394	+22 31 21.1	+0.24	23 15.4
32	5 40 39.61	+1.377	+22 24 25.7	+0.90	1 0.0	32	5 58 1.20	+1.392	+22 31 26.7	+0.22	23 12.0
Day of the Month.						Day of the Month.					
Polar Semidiameter . .						Polar Semidiameter . .					
Horizontal Parallax . .						Horizontal Parallax . .					
8.0 7.9 7.9 7.8						7.8 7.8 7.8 7.8					
0.9 0.9 0.9 0.9						0.9 0.9 0.9 0.9					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	5 57 27.77	+1.364	+22 31 21.1	+0.94	23 15.4	1	6 13 55.61	+1.230	+22 30 31.0	-0.34	21 29.8
2	5 58 1.20	1.362	22 31 26.7	0.93	23 12.0	2	6 14 25.04	1.222	22 30 22.7	0.35	21 26.4
3	5 58 34.57	1.360	22 31 31.8	0.90	23 8.6	3	6 14 54.27	1.214	22 30 14.0	0.37	21 22.9
4	5 59 7.88	1.357	22 31 36.4	0.18	23 5.2	4	6 15 23.30	1.205	22 30 5.0	0.38	21 19.4
5	5 59 41.12	1.354	22 31 40.4	0.16	23 1.9	5	6 15 52.12	1.196	22 29 55.7	0.39	21 16.0
6	6 0 14.29	+1.351	+22 31 44.0	+0.14	22 58.5	6	6 16 20.71	+1.187	+22 29 46.1	-0.41	21 12.5
7	6 0 47.38	1.377	22 31 47.0	0.12	22 55.1	7	6 16 49.09	1.178	22 29 36.2	0.42	21 9.1
8	6 1 20.40	1.374	22 31 49.5	0.10	22 51.7	8	6 17 17.24	1.168	22 29 26.0	0.43	21 5.7
9	6 1 53.32	1.370	22 31 51.5	0.07	22 48.3	9	6 17 45.16	1.158	22 29 15.5	0.44	21 2.2
10	6 2 26.15	1.366	22 31 53.0	0.05	22 44.9	10	6 18 12.84	1.148	22 29 4.8	0.45	20 58.7
11	6 2 58.89	+1.362	+22 31 54.0	+0.03	22 41.5	11	6 18 40.28	+1.138	+22 28 53.8	-0.46	20 55.2
12	6 3 31.53	1.356	22 31 54.5	+0.01	22 38.1	12	6 19 7.48	1.128	22 28 42.6	0.47	20 51.7
13	6 4 4.06	1.353	22 31 54.6	-0.01	22 34.7	13	6 19 34.42	1.117	22 28 31.2	0.48	20 48.2
14	6 4 36.48	1.348	22 31 54.2	0.03	22 31.3	14	6 20 1.10	1.106	22 28 19.6	0.49	20 44.7
15	6 5 8.78	1.343	22 31 53.3	0.05	22 27.9	15	6 20 27.52	1.095	22 28 7.7	0.50	20 41.2
16	6 5 40.96	+1.338	+22 31 51.9	-0.07	22 24.5	16	6 20 53.67	+1.084	+22 27 55.6	-0.51	20 37.7
17	6 6 13.01	1.333	22 31 50.1	0.09	22 21.1	17	6 21 19.55	1.073	22 27 43.3	0.52	20 34.2
18	6 6 44.93	1.227	22 31 47.8	0.11	22 17.7	18	6 21 45.16	1.061	22 27 30.9	0.52	20 30.7
19	6 7 16.72	1.222	22 31 45.0	0.12	22 14.3	19	6 22 10.48	1.049	22 27 18.3	0.53	20 27.2
20	6 7 48.36	1.216	22 31 41.8	0.14	22 10.9	20	6 22 35.53	1.038	22 27 5.5	0.54	20 23.7
21	6 8 19.86	+1.209	+22 31 38.1	-0.16	22 7.5	21	6 23 0.29	+1.025	+22 26 52.6	-0.54	20 20.2
22	6 8 51.21	1.203	22 31 34.0	0.18	22 4.1	22	6 23 24.75	1.013	22 26 39.6	0.55	20 16.7
23	6 9 22.41	1.197	22 31 29.5	0.20	22 0.7	23	6 23 48.91	1.001	22 26 26.4	0.55	20 13.1
24	6 9 53.45	1.190	22 31 24.6	0.21	21 57.3	24	6 24 12.78	0.988	22 26 13.1	0.56	20 9.6
25	6 10 24.33	1.183	22 31 19.3	0.23	21 53.9	25	6 24 36.35	0.975	22 25 59.7	0.56	20 6.0
26	6 10 55.04	+1.176	+22 31 13.5	-0.25	21 50.4	26	6 24 59.60	+0.962	+22 25 46.3	-0.56	20 2.5
27	6 11 25.58	1.169	22 31 7.4	0.26	21 47.0	27	6 25 22.54	0.949	22 25 32.8	0.56	19 58.9
28	6 11 55.95	1.162	22 31 0.9	0.26	21 43.6	28	6 25 45.17	0.936	22 25 19.2	0.57	19 55.4
29	6 12 26.14	1.154	22 30 54.0	0.30	21 40.2	29	6 26 7.48	0.923	22 25 5.6	0.57	19 51.8
30	6 12 56.15	1.146	22 30 46.7	0.31	21 36.7	30	6 26 29.45	0.909	22 24 51.9	0.57	19 48.2
31	6 13 25.98	+1.139	+22 30 39.0	-0.33	21 33.3	31	6 26 51.09	+0.895	+22 24 38.3	-0.57	19 44.6
32	6 13 55.61	+1.130	+22 30 31.0	-0.34	21 29.8	32	6 27 12.40	+0.881	+22 24 24.6	-0.57	19 41.0
Day of the Month.		1st.	11th.	21st.	31st.	Day of the Month.		1st.	11th.	21st.	31st.
Polar Semidiameter . .		7.8	7.8	7.9	7.9	Polar Semidiameter . .		8.0	8.0	8.1	8.3
Horizontal Parallax . .		0.9	0.9	0.9	0.9	Horizontal Parallax . .		0.9	0.9	0.9	0.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.										
SEPTEMBER.						OCTOBER.				
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"
1	6 27 12.40	+0.881	+22 24 24.6	−0.57	19 41.0	1	6 34 53.45	+0.377	+22 18 32.8	−0.33
2	6 27 33.37	0.866	22 24 11.0	0.57	19 37.4	2	6 35 2.26	0.358	22 18 24.9	0.32
3	6 27 53.99	0.852	22 23 57.4	0.57	19 33.8	3	6 35 10.62	0.339	22 18 17.4	0.31
4	6 28 14.26	0.837	22 23 43.8	0.57	19 30.2	4	6 35 18.51	0.319	22 18 10.2	0.29
5	6 28 34.18	0.822	22 23 30.2	0.56	19 26.6	5	6 35 25.94	0.300	22 18 3.4	0.27
6	6 28 53.74	+0.807	+22 23 16.7	−0.56	19 23.0	6	6 35 32.90	+0.280	+22 17 57.1	−0.26
7	6 29 12.92	0.792	22 23 3.3	0.56	19 19.4	7	6 35 39.39	0.260	22 17 51.1	0.24
8	6 29 31.74	0.777	22 22 49.9	0.55	19 15.8	8	6 35 45.41	0.241	22 17 45.5	0.22
9	6 29 50.19	0.761	22 22 36.6	0.55	19 12.2	9	6 35 50.95	0.221	22 17 40.3	0.21
10	6 30 8.26	0.745	22 22 23.5	0.55	19 8.5	10	6 35 56.01	0.201	22 17 35.5	0.19
11	6 30 25.94	+0.728	+22 22 10.5	−0.54	19 4.9	11	6 36 0.60	+0.181	+22 17 31.2	−0.17
12	6 30 43.23	0.712	22 21 57.6	0.54	19 1.2	12	6 36 4.71	0.161	22 17 27.2	0.16
13	6 31 0.13	0.696	22 21 44.8	0.53	18 57.5	13	6 36 8.34	0.141	22 17 23.7	0.14
14	6 31 16.64	0.679	22 21 32.2	0.52	18 53.9	14	6 36 11.49	0.121	22 17 20.6	0.12
15	6 31 32.74	0.663	22 21 19.8	0.51	18 50.2	15	6 36 14.16	0.101	22 17 17.9	0.10
16	6 31 48.44	+0.646	+22 21 7.5	−0.51	18 46.5	16	6 36 16.35	+0.081	+22 17 15.7	−0.08
17	6 32 3.74	0.629	22 20 55.5	0.50	18 42.8	17	6 36 18.05	0.061	22 17 13.9	0.06
18	6 32 18.63	0.612	22 20 43.6	0.49	18 39.1	18	6 36 19.28	0.041	22 17 12.6	0.05
19	6 32 33.11	0.594	22 20 31.9	0.48	18 35.5	19	6 36 20.02	0.021	22 17 11.7	0.03
20	6 32 47.16	0.577	22 20 20.5	0.47	18 31.8	20	6 36 20.28	+0.001	22 17 11.3	−0.01
21	6 33 0.80	+0.560	+22 20 9.3	−0.46	18 28.0	21	6 36 20.06	−0.019	+22 17 11.3	+0.01
22	6 33 14.02	0.542	22 19 58.4	0.45	18 24.3	22	6 36 19.35	0.039	22 17 11.8	0.03
23	6 33 26.81	0.524	22 19 47.7	0.44	18 20.6	23	6 36 18.17	0.059	22 17 12.8	0.05
24	6 33 39.18	0.506	22 19 37.3	0.43	18 16.9	24	6 36 16.51	0.079	22 17 14.2	0.07
25	6 33 51.11	0.488	22 19 27.1	0.42	18 13.1	25	6 36 14.36	0.099	22 17 16.1	0.09
26	6 34 2.61	+0.470	+22 19 17.3	−0.40	18 9.4	26	6 36 11.74	−0.119	+22 17 18.5	+0.11
27	6 34 13.67	0.451	22 19 7.7	0.39	18 5.6	27	6 36 8.64	0.139	22 17 21.3	0.13
28	6 34 24.28	0.433	22 18 58.5	0.37	18 1.9	28	6 36 5.06	0.159	22 17 24.6	0.15
29	6 34 34.45	0.415	22 18 49.6	0.36	17 58.1	29	6 36 1.00	0.179	22 17 28.3	0.17
30	6 34 44.18	0.396	22 18 41.0	0.35	17 54.3	30	6 35 56.47	0.199	22 17 32.5	0.18
31	6 34 53.45	+0.377	+22 18 32.8	−0.33	17 50.5	31	6 35 51.46	−0.219	+22 17 37.1	+0.20
32	6 35 2.26	+0.358	+22 18 24.9	−0.32	17 46.8	32	6 35 45.97	−0.238	+22 17 42.3	+0.22
Day of the Month.						Day of the Month.				
Polar Semidiameter . .						Polar Semidiameter . .				
Horizontal Parallax . .						Horizontal Parallax . .				
1st.						1st.				
11th.						11th.				
21st.						21st.				
31st.						31st.				
8.3						8.7				
0.9						1.0				
8.4						8.9				
1.0						1.0				
8.6						9.0				
1.0						1.0				
8.7						9.2				
1.0						1.0				

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.



## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	h m s 6 35 45.97	s -0.938	° ' " +22 17 42.3	" +0.98	h m 15 49.4	1	h m s 6 29 41.60	s -0.736	° ' " +22 23 18.4	" +0.66	h m 13 45.3
2	6 35 40.01	0.958	22 17 47.9	0.94	15 45.3	2	6 29 43.79	0.748	22 23 34.3	0.67	13 41.0
3	6 35 33.59	0.977	22 17 53.9	0.96	15 41.3	3	6 29 5.70	0.759	22 23 50.4	0.67	13 36.8
4	6 35 26.70	0.997	22 18 0.4	0.97	15 37.2	4	6 28 47.35	0.770	22 24 6.6	0.68	13 32.6
5	6 35 19.34	0.316	22 18 7.3	0.90	15 33.2	5	6 28 28.73	0.781	22 24 23.0	0.69	13 28.3
6	6 35 11.52	-0.335	+22 18 14.6	+0.31	15 29.1	6	6 28 9.86	-0.791	+22 24 39.6	+0.69	13 24.1
7	6 35 3.24	0.354	22 18 22.4	0.33	15 25.0	7	6 27 50.74	0.801	22 24 56.3	0.70	13 19.8
8	6 34 54.51	0.373	22 18 30.6	0.35	15 20.9	8	6 27 31.41	0.810	22 25 13.1	0.70	13 15.6
9	6 34 45.33	0.392	22 18 39.2	0.37	15 16.8	9	6 27 11.87	0.819	22 25 30.0	0.71	13 11.3
10	6 34 35.71	0.410	22 18 48.2	0.38	15 12.8	10	6 26 52.10	0.828	22 25 47.0	0.71	13 7.0
11	6 34 25.65	-0.428	+22 18 57.7	+0.40	15 8.7	11	6 26 32.14	-0.835	+22 26 4.1	+0.72	13 2.8
12	6 34 15.15	0.446	22 19 7.5	0.42	15 4.5	12	6 26 12.01	0.842	22 26 21.3	0.72	12 58.5
13	6 34 4.22	0.464	22 19 17.7	0.43	15 0.4	13	6 25 51.71	0.849	22 26 38.6	0.72	12 54.2
14	6 33 52.88	0.481	22 19 28.3	0.45	14 56.3	14	6 25 31.24	0.856	22 26 55.9	0.72	12 50.0
15	6 33 41.12	0.499	22 19 39.3	0.47	14 52.2	15	6 25 10.63	0.861	22 27 13.2	0.72	12 45.7
16	6 33 28.94	-0.516	+22 19 50.7	+0.48	14 48.0	16	6 24 49.89	-0.867	+22 27 30.6	+0.73	12 41.4
17	6 33 16.36	0.532	22 20 2.4	0.50	14 43.9	17	6 24 29.03	0.872	22 27 48.1	0.73	12 37.2
18	6 33 3.38	0.549	22 20 14.5	0.51	14 39.7	18	6 24 8.05	0.877	22 28 5.5	0.73	12 32.9
19	6 32 50.02	0.565	22 20 26.9	0.52	14 35.6	19	6 23 46.98	0.880	22 28 23.0	0.73	12 28.6
20	6 32 36.26	0.581	22 20 39.0	0.54	14 31.4	20	6 23 25.82	0.883	22 28 40.5	0.73	12 24.3
21	6 32 22.13	-0.596	+22 20 52.6	+0.55	14 27.2	21	6 23 4.59	-0.887	+22 28 57.9	+0.73	12 20.0
22	6 32 7.63	0.612	22 21 6.0	0.56	14 23.1	22	6 22 43.29	0.889	22 29 15.4	0.73	12 15.7
23	6 31 52.77	0.627	22 21 19.6	0.57	14 18.9	23	6 22 21.94	0.890	22 29 32.8	0.72	12 11.4
24	6 31 37.54	0.642	22 21 33.6	0.59	14 14.7	24	6 22 0.56	0.891	22 29 50.2	0.72	12 7.1
25	6 31 21.96	0.656	22 21 47.8	0.60	14 10.5	25	6 21 39.15	0.893	22 30 7.5	0.72	12 2.8
26	6 31 6.04	-0.670	+22 22 2.3	+0.61	14 6.3	26	6 21 17.71	-0.893	+22 30 24.8	+0.72	11 58.6
27	6 30 49.79	0.684	22 22 17.0	0.62	14 2.1	27	6 20 56.27	0.893	22 30 42.0	0.72	11 54.3
28	6 30 33.21	0.698	22 22 32.0	0.63	13 57.9	28	6 20 34.85	0.892	22 30 59.1	0.71	11 50.0
29	6 30 16.31	0.711	22 22 47.3	0.64	13 53.7	29	6 20 13.45	0.891	22 31 16.2	0.71	11 45.7
30	6 29 59.10	0.723	22 23 2.7	0.65	13 49.5	30	6 19 52.07	0.890	22 31 33.2	0.71	11 41.4
31	6 29 41.60	-0.736	+22 23 18.4	+0.66	13 45.3	31	6 19 30.74	-0.887	+22 31 50.1	+0.70	11 37.1
32	6 29 23.79	-0.748	+22 23 34.3	+0.67	13 41.0	32	6 19 9.48	-0.884	+22 32 7.0	+0.70	11 32.8
Day of the Month.						Day of the Month.					
Polar Semidiameter . .						Polar Semidiameter . .					
Horizontal Parallax . .						Horizontal Parallax . .					
1st. 11th. 21st. 31st.						1st. 11th. 21st. 31st.					
9.2 9.4 9.5 9.6						9.6 9.7 9.7 9.7					
1.0 1.1 1.1 1.1						1.1 1.1 1.1 1.1					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.											
Date.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Date.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
Jan. 0	h m s 12 11 53.54	+1.300	° ' " s -0 28 27.7	- 6.47	h m 17 27.8	July 3	h m s 11 57 58.18	+5.220	° ' " s +1 03 4.3	-36.75	h m 5 10.4
4	12 11 57.43	+0.558	0 28 42.7	- 1.07	17 12.1	7	11 58 20.54	5.947	0 57 58.0	41.36	4 55.1
8	12 11 58.00	-0.373	0 28 36.2	+ 4.33	16 56.4	11	11 58 45.74	6.648	0 55 3.6	45.84	4 39.8
12	12 11 55.25	1.101	0 28 8.2	9.85	16 40.6	15	11 59 13.69	7.396	0 51 51.5	50.17	4 24.5
16	12 11 49.21	1.990	0 27 19.1	14.90	16 24.8	19	11 59 44.31	7.975	0 48 22.5	54.32	4 9.3
20	12 11 39.92	-2.790	-0 26 9.2	+20.03	16 8.9	23	12 0 17.46	+6.595	+0 44 37.2	-58.97	3 54.1
24	12 11 27.48	3.493	0 24 39.1	24.97	15 52.9	27	12 0 53.03	9.187	0 40 36.6	62.02	3 39.0
28	12 11 12.01	4.237	0 22 49.6	29.79	15 36.9	31	12 1 30.91	9.750	0 36 21.3	65.58	3 23.9
Feb. 1	12 10 53.62	4.951	0 20 41.7	34.94	15 20.9	Aug. 4	12 2 11.00	10.396	0 31 52.1	68.96	3 8.8
5	12 10 32.44	5.638	0 18 16.0	39.53	15 4.8	8	12 2 53.17	10.799	0 27 9.9	72.13	2 53.8
9	12 10 8.62	-6.372	-0 15 33.7	+42.56	14 48.7	12	12 3 37.29	11.364	+0 22 15.4	-75.06	2 38.8
13	12 9 49.32	6.670	0 12 36.0	46.96	14 32.5	16	12 4 23.24	11.699	0 17 9.7	77.75	2 23.8
17	12 9 13.73	7.414	0 9 24.0	49.65	14 16.3	20	12 5 10.83	12.091	0 11 53.8	80.19	2 8.9
21	12 8 43.08	7.901	0 5 59.2	52.64	14 0.1	24	12 5 59.92	12.448	0 6 28.6	82.36	1 54.0
25	12 8 10.60	8.398	-0 2 23.3	55.33	13 43.8	28	12 6 50.36	12.768	+0 0 55.2	84.30	1 39.1
Mar. 1	12 7 36.54	-8.695	+0 1 22.2	+57.44	13 27.5	Sept. 1	12 7 42.01	13.055	-0 4 45.5	-86.01	1 24.2
5	12 7 1.12	9.002	0 5 15.8	50.96	13 11.2	5	12 8 34.75	13.304	0 10 32.5	87.45	1 9.4
9	12 6 24.60	9.240	0 9 15.7	60.67	12 54.9	9	12 9 28.39	13.510	0 16 24.8	88.64	0 54.5
13	12 5 47.22	9.499	0 13 20.5	61.60	12 38.5	13	12 10 22.77	13.671	0 22 21.2	89.53	0 39.7
17	12 5 9.26	9.538	0 17 27.9	62.07	12 22.1	17	12 11 17.70	13.790	0 28 20.6	90.11	0 24.9
21	12 4 31.02	-9.574	+0 21 36.5	+62.13	12 5.8	21	12 12 13.03	13.866	-0 34 21.8	-90.44	0 10.1
25	12 3 52.77	9.540	0 25 44.3	61.69	11 49.4	25	12 13 8.58	13.902	0 40 23.8	90.52	23 51.6
29	12 3 14.78	9.444	0 29 49.4	60.81	11 33.1	29	12 14 4.19	13.998	0 46 25.5	90.30	23 36.8
Apr. 2	12 2 37.32	9.279	0 33 50.4	59.58	11 16.7	Oct. 3	12 14 59.71	13.854	0 52 25.9	89.82	23 22.0
6	12 2 0.63	9.057	0 37 45.5	57.99	11 0.4	7	12 15 54.96	13.764	0 58 23.7	89.05	23 7.2
10	12 1 24.95	-8.771	+0 41 33.2	+55.85	10 44.1	11	12 16 49.76	13.696	-1 4 17.9	-87.96	22 52.3
14	12 0 50.55	8.492	0 45 11.8	53.39	10 27.8	15	12 17 43.91	13.442	1 10 7.2	86.61	22 37.5
18	12 0 17.66	8.013	0 48 39.8	50.55	10 11.5	19	12 18 37.24	13.216	1 15 50.4	84.95	22 22.7
22	11 59 46.52	7.548	0 51 55.7	47.35	9 55.3	23	12 19 29.59	12.948	1 21 26.5	83.05	22 7.8
26	11 59 17.33	7.037	0 54 58.2	43.86	9 39.1	27	12 20 20.77	12.639	1 26 54.4	80.87	21 52.9
30	11 58 50.27	-6.487	+0 57 46.3	+40.14	9 22.9	31	12 21 10.65	12.390	-1 32 13.1	-78.42	21 38.0
May 4	11 58 25.51	5.891	1 0 18.9	36.13	9 6.8	Nov. 4	12 21 59.03	11.895	1 37 21.4	75.70	21 23.1
8	11 58 3.19	5.960	1 2 34.9	31.87	8 50.7	8	12 22 45.75	11.456	1 42 18.3	72.68	21 8.1
12	11 57 43.47	4.593	1 4 33.6	27.42	8 34.6	12	12 23 30.62	10.975	1 47 2.6	69.42	20 53.1
16	11 57 26.49	3.892	1 6 14.1	22.77	8 18.6	16	12 24 13.49	10.451	1 51 33.3	65.90	20 38.1
20	11 57 12.37	-3.167	+1 7 35.6	+17.97	8 2.6	20	12 24 54.18	+9.801	-1 55 49.4	-62.14	20 23.0
24	11 57 1.18	2.494	1 8 37.7	13.07	7 46.7	24	12 25 32.58	9.301	1 59 50.2	58.19	20 7.9
28	11 56 52.90	1.699	1 9 20.0	8.10	7 30.9	28	12 26 8.54	8.675	2 3 34.7	54.08	19 52.8
June 1	11 56 47.84	0.905	1 9 42.4	+ 3.08	7 15.1	Dec. 2	12 26 41.93	8.013	2 7 2.0	49.69	19 37.6
5	11 56 45.77	-0.130	1 9 44.6	- 1.99	6 59.3	6	12 27 12.59	7.315	2 10 11.4	45.03	19 22.4
9	11 56 46.81	+0.652	+1 9 26.4	- 7.11	6 43.6	10	12 27 40.40	+6.585	-2 13 2.0	-40.24	19 7.1
13	11 56 50.99	1.437	1 8 47.7	12.21	6 27.9	14	12 28 5.24	5.833	2 15 33.1	35.32	18 51.8
17	11 56 58.30	2.218	1 7 48.7	17.29	6 12.3	18	12 28 27.04	5.061	2 17 44.4	30.37	18 36.4
21	11 57 8.73	2.993	1 6 29.5	22.30	5 56.8	22	12 28 45.70	4.370	2 19 35.2	25.12	18 21.0
25	11 57 22.23	3.752	1 4 50.4	27.21	5 41.3	26	12 29 1.18	3.464	2 21 5.2	19.89	18 5.5
29	11 57 38.73	+4.496	+1 2 51.9	-32.03	5 25.8	30	12 29 13.40	+2.642	-2 22 14.2	-14.58	17 50.0
July 3	11 57 58.18	+5.220	+1 0 34.3	-36.75	5 10.4	34	12 29 22.30	+1.809	-2 23 1.8	-9.20	17 34.4

Greatest horizontal parallax,  
Greatest semidiameter,

March 21, 0".51.  
March 21, 1".94.

Least horizontal parallax,  
Least semidiameter,

September 25, 0".46.  
September 25, 1".74.

## GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Date.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
Jan. 0	3 15 19.61	-3.943	+16 14 16.9	-12.96	8 32.7	July 3	3 31 20.26	+6.816	+17 19 18.0	+21.81	20 41.4
4	3 15 4.76	3.478	16 13 31.8	10.30	8 16.7	7	3 31 46.80	6.450	17 20 42.2	20.30	20 26.1
8	3 14 51.60	2.991	16 12 54.7	8.30	8 0.7	11	3 32 11.82	6.059	17 22 0.3	18.70	20 10.7
12	3 14 40.86	2.486	16 12 25.6	6.92	7 44.8	15	3 32 35.23	5.644	17 23 11.8	17.05	19 55.4
16	3 14 31.95	1.963	16 12 5.1	4.02	7 29.0	19	3 32 56.93	5.205	17 24 16.6	15.35	19 40.0
20	3 14 25.17	-1.425	+16 11 53.5	-1.78	7 13.1	23	3 33 16.85	+4.753	+17 25 14.5	+13.60	19 24.6
24	3 14 20.57	0.875	16 11 50.8	+0.45	6 57.3	27	3 33 34.94	4.284	17 26 5.4	11.22	19 9.2
28	3 14 18.18	-0.323	16 11 57.0	2.65	6 41.6	31	3 33 51.12	3.802	17 26 49.2	10.02	18 53.7
Feb. 1	3 14 18.00	+0.932	16 12 12.0	4.85	6 25.8	Aug. 4	3 34 5.34	3.304	17 27 25.7	8.17	18 38.2
5	3 14 20.04	0.790	16 12 35.9	7.04	6 10.1	8	3 34 17.53	2.790	17 27 54.7	6.32	18 22.7
9	3 14 24.32	+1.359	+16 13 8.5	+9.23	5 54.5	12	3 34 27.64	+2.966	+17 28 16.3	+4.47	18 7.1
13	3 14 30.84	1.909	16 13 49.8	11.40	5 38.8	16	3 34 35.64	1.734	17 28 30.4	2.57	17 51.5
17	3 14 39.57	2.457	16 14 39.6	13.52	5 23.3	20	3 34 41.49	1.196	17 28 36.8	+0.67	17 35.9
21	3 14 50.47	2.993	16 15 37.7	15.55	5 7.7	24	3 34 45.19	0.655	17 28 35.7	-1.20	17 20.2
25	3 15 3.50	3.519	16 16 43.8	17.50	4 52.2	28	3 34 46.73	+0.116	17 28 27.1	3.05	17 4.5
Mar. 1	3 15 18.60	+4.027	+16 17 57.5	+19.37	4 36.7	Sept. 1	3 34 46.12	-0.422	+17 28 11.2	-4.90	16 48.7
5	3 15 35.69	4.517	16 19 18.6	21.15	4 21.3	5	3 34 43.35	0.961	17 27 48.0	6.70	16 33.0
9	3 15 54.72	4.993	16 20 46.6	22.85	4 5.9	9	3 34 38.43	1.497	17 27 17.6	8.49	16 17.1
13	3 16 15.62	5.458	16 22 21.2	24.45	3 50.5	13	3 34 31.39	2.020	17 26 40.1	10.23	16 1.3
17	3 16 38.32	5.889	16 24 2.0	25.95	3 35.2	17	3 34 22.29	2.527	17 25 55.7	11.90	15 45.4
21	3 17 2.71	+6.302	+16 25 48.7	+27.34	3 19.8	21	3 34 11.19	-3.019	+17 25 4.8	-13.52	15 29.5
25	3 17 28.70	6.690	16 27 40.7	28.60	3 4.5	25	3 33 58.16	3.491	17 24 7.6	15.07	15 13.5
29	3 17 56.19	7.050	16 29 37.4	29.73	2 49.3	29	3 33 43.28	3.945	17 23 4.5	16.58	14 57.5
Apr. 2	3 18 25.06	7.382	16 31 38.4	30.74	2 34.0	Oct. 3	3 33 26.62	4.379	17 21 55.7	17.87	14 41.5
6	3 18 55.21	7.690	16 33 43.2	31.64	2 18.8	7	3 33 8.27	4.790	17 20 41.7	19.12	14 25.5
10	3 19 26.54	+7.971	+16 35 51.4	+32.43	2 3.6	11	3 32 48.34	-5.167	+17 19 22.9	-20.22	14 9.4
14	3 19 58.94	8.294	16 38 2.4	33.08	1 48.4	15	3 32 26.97	5.509	17 17 59.6	21.35	13 53.4
18	3 20 32.28	8.440	16 40 15.8	33.60	1 33.2	19	3 32 4.31	5.815	17 16 32.3	22.27	13 37.2
22	3 21 6.42	8.627	16 42 31.0	33.98	1 18.1	23	3 31 40.49	6.088	17 15 1.7	23.02	13 21.1
26	3 21 41.25	8.784	16 44 47.4	34.25	1 2.9	27	3 31 15.65	6.396	17 13 28.3	23.63	13 5.0
30	3 22 16.65	+8.911	+16 47 4.7	+34.40	0 47.8	31	3 30 49.94	-6.525	+17 11 52.8	-24.10	12 48.8
May 4	3 22 52.49	9.006	16 49 22.3	34.40	0 32.6	Nov. 4	3 30 23.51	6.622	17 10 15.6	24.48	12 32.6
8	3 23 28.66	9.074	16 51 39.7	34.37	0 17.5	8	3 29 56.54	6.795	17 8 37.1	24.70	12 16.5
12	3 24 5.04	9.111	16 53 56.4	34.05	0 2.4	12	3 29 29.21	6.962	17 6 58.2	24.72	12 0.3
16	3 24 41.51	9.116	16 56 12.0	33.73	23 43.5	16	3 29 1.70	6.983	17 5 19.5	24.60	11 44.1
20	3 25 17.93	+9.065	+16 58 26.1	+33.22	23 28.4	20	3 28 34.20	-6.961	+17 3 41.6	-24.30	11 27.9
24	3 25 54.15	9.091	17 0 38.2	32.72	23 13.3	24	3 28 6.87	6.796	17 2 5.2	23.85	11 11.7
28	3 26 30.06	8.930	17 2 47.7	32.03	22 58.1	28	3 27 39.89	6.688	17 0 30.9	23.25	10 55.6
June 1	3 27 5.54	8.810	17 4 54.3	31.26	22 43.0	Dec. 2	3 27 13.43	6.537	16 58 59.4	22.47	10 39.4
5	3 27 40.50	8.661	17 6 57.7	30.40	22 27.8	6	3 26 47.65	6.344	16 57 31.3	21.57	10 23.2
9	3 28 14.80	+8.484	+17 8 57.4	+29.45	22 12.7	10	3 26 22.74	-6.104	+16 56 7.1	-20.50	10 7.1
13	3 28 48.33	8.273	17 10 53.1	28.39	21 57.5	14	3 25 58.88	5.890	16 54 47.6	19.27	9 51.0
17	3 29 20.95	8.033	17 12 44.3	27.23	21 42.3	18	3 25 36.22	5.502	16 53 33.2	17.92	9 34.9
21	3 29 52.56	7.767	17 14 30.7	25.97	21 27.1	22	3 25 14.90	5.151	16 52 24.4	16.42	9 18.8
25	3 30 23.05	7.473	17 16 12.0	24.65	21 11.9	26	3 24 55.05	4.767	16 51 21.9	14.82	9 2.8
29	3 30 52.31	+7.155	+17 17 47.8	+23.27	20 56.6	30	3 24 36.80	-4.351	+16 50 26.0	-13.12	8 46.7
July 3	3 31 20.26	+6.816	+17 19 18.0	+21.81	20 41.4	34	3 24 20.28	-3.904	+16 49 37.1	-11.32	8 30.7

Least horizontal parallax,  
Least semidiameter,

May 16, 0".29.  
May 16, 1".25.

Greatest horizontal parallax, November 16, 0".31.  
Greatest semidiameter, November 16, 1".33.

MERCURY.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan. 0	82° 23' 59.7"	6 18 54.8	+12 10.5	+4° 4' 25.2"	+37 43.8	9.4883955	9.8436901	9.8366656
2	94 57 33.5	6 13 40.0	12 47.7	5 12 55.4	30 27.8	9.4921271	9.8314071	9.8280475
4	107 15 0.7	6 2 57.4	11 3.7	6 5 22.4	21 51.1	9.4990976	9.8266450	9.8271789
6	119 6 31.0	5 47 57.2	7 29.5	6 40 7.5	12 55.3	9.5087543	9.8295548	9.8336163
8	130 24 57.5	5 30 8.9	+ 2 54.4	6 57 27.8	+ 4 33.5	9.5204219	9.8391632	9.8459706
10	141 6 13.7	5 11 0.9	- 1 50.7	+6 59 5.6	- 2 43.0	9.5334120	9.8538060	9.8624437
12	151 8 57.2	4 51 46.6	6 5.8	6 47 29.3	8 39.6	9.5471000	9.8716759	9.8813183
14	160 33 51.8	4 33 19.1	9 24.9	6 25 20.6	13 16.4	9.5609643	9.8912124	9.9012250
16	169 23 7.5	4 16 12.0	11 37.2	5 55 11.6	16 41.5	9.5745994	9.9112484	9.9211968
18	177 39 45.3	4 0 49.2	12 43.0	5 19 14.7	19 6.7	9.5877047	9.9310032	9.9406166
20	185 27 5.2	3 46 55.0	-12 46.8	+4 39 16.8	-20 44.2	9.6000676	9.9499995	9.9591249
22	192 48 33.6	3 34 50.2	11 58.5	3 56 42.9	21 44.2	9.6115456	9.9679754	9.9765397
24	199 47 30.5	3 24 22.1	10 29.0	3 12 38.9	22 15.7	9.6220464	9.9848119	9.9927905
26	206 27 1.8	3 15 23.5	8 28.4	2 27 53.9	22 26.2	9.6315162	0.0004771	0.0078753
28	212 49 59.7	3 7 47.5	6 6.8	1 43 4.4	22 20.9	9.6399251	0.0149910	0.0218304
30	218 59 1.8	3 1 26.6	- 3 33.1	+0 58 38.0	-22 3.9	9.6472612	0.0284014	0.0347121
Feb. 1	224 56 31.7	2 56 14.2	- 0 54.7	+0 14 54.5	21 38.1	9.6535230	0.0407705	0.0465848
3	230 44 40.8	2 52 4.8	+ 1 42.0	-0 27 50.0	21 5.4	9.6587145	0.0521636	0.0575155
5	236 25 30.2	2 48 53.8	4 11.3	1 9 23.6	20 27.4	9.6628432	0.0626479	0.0675681
7	242 0 52.7	2 46 37.5	6 28.6	1 49 36.4	19 44.7	9.6659170	0.0722838	0.0768020
9	247 32 34.8	2 45 13.0	+ 8 29.9	-2 28 19.7	-18 57.9	9.6679428	0.0811290	0.0852706
11	253 2 18.3	2 44 38.7	10 11.4	3 5 25.1	18 6.8	9.6689255	0.0892323	0.0930198
13	258 31 42.5	2 44 53.4	11 30.0	3 40 43.9	17 11.2	9.6688681	0.0966383	0.1000913
15	264 2 24.6	2 45 56.8	12 23.5	4 14 6.5	16 10.4	9.6677702	0.1033833	0.1065178
17	269 36 2.8	2 47 49.5	12 49.9	4 45 21.5	15 3.7	9.6656289	0.1094979	0.1123259
19	275 14 18.2	2 50 33.2	+12 46.9	-5 14 16.4	-13 49.9	9.6624393	0.1150040	0.1175337
21	280 58 54.5	2 54 11.4	12 13.5	5 40 35.0	12 27.1	9.6581938	0.1199163	0.1221519
23	286 51 41.5	2 58 45.9	11 9.1	6 3 57.5	10 53.4	9.6528843	0.1242408	0.1261824
25	292 54 35.3	3 4 19.0	9 33.6	6 24 0.0	9 6.8	9.6465042	0.1279752	0.1296173
27	299 9 40.9	3 10 57.7	7 28.4	6 40 14.3	7 4.6	9.6390496	0.1311062	0.1324383
Mar. 1	305 39 13.0	3 18 46.4	+ 4 56.1	-6 52 6.5	- 4 43.3	9.6305228	0.1336093	0.1346144
3	312 25 36.9	3 27 50.5	+ 2 1.3	6 58 52.4	- 1 59.4	9.6209376	0.1354477	0.1361020
5	319 31 29.2	3 38 15.7	- 1 8.6	6 59 45.8	+ 1 10.8	9.6103259	0.1365694	0.1368409
7	326 59 37.6	3 50 7.4	4 23.7	6 53 49.3	4 51.1	9.5987453	0.1369063	0.1367535
9	334 52 58.5	4 3 28.5	7 30.8	6 39 59.4	9 4.6	9.5862929	0.1363703	0.1357425
11	343 14 30.9	4 18 18.5	-10 12.1	-6 17 7.9	+13 52.6	9.5731182	0.1348543	0.1336884
13	352 7 8.7	4 34 32.6	12 6.2	5 44 6.9	19 13.3	9.5594423	0.1322264	0.1304485
15	1 33 28.2	4 51 56.5	12 52.1	4 59 57.6	24 59.1	9.5455759	0.1283334	0.1258586
17	11 35 24.3	5 10 3.8	12 10.0	4 4 4.2	30 54.0	9.5319382	0.1230011	0.1197369
19	22 13 45.1	5 28 12.8	9 48.5	2 56 33.3	36 31.2	9.5190624	0.1160416	0.1118918
21	33 27 37.5	5 45 24.2	- 5 51.8	-1 38 36.0	+41 13.3	9.5075830	0.1072643	0.1021379
23	45 13 53.5	6 0 22.8	- 0 46.8	- 0 12 47.3	44 14.8	9.4981912	0.0964943	0.0903182
25	57 26 44.3	6 11 44.8	+ 4 37.2	+1 16 47.2	44 52.7	9.4915544	0.0835982	0.0763280
27	69 57 35.9	6 18 12.0	9 16.7	2 44 49.4	42 40.0	9.4882048	0.0685075	0.0601416
29	82 35 40.4	6 18 52.0	12 12.2	4 5 33.9	37 38.1	9.4884314	0.0512417	0.0418263
31	95 9 3.5	6 13 31.7	+12 47.1	+5 13 50.8	+30 20.4	9.4922150	0.0319188	0.0215481
33	107 26 10.0	6 2 45.3	+11 1.2	+6 6 2.0	+21 41.7	9.4992305	0.0107486	

MERCURY.									
GREENWICH MEAN NOON.									
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
							At Date.	At Intermediate Date.	
Apr. 0	95 9 3.5	6 13 31.7	+12 47.1	+5 13 50.8	+30 20.4	9.4922150	0.0319188	0.0215481	
2	107 26 10.0	6 2 45.3	11 1.2	6 6 2.0	21 41.7	9.4992305	0.0107486	9.9095582	
4	119 17 12.5	5 47 42.1	7 25.5	6 40 30.8	12 47.8	9.5089222	9.9880192	9.9761763	
6	130 35 6.0	5 29 51.6	+ 2 50.0	6 57 36.0	+ 4 26.3	9.5206143	9.9640774	9.9517715	
8	141 15 47.2	5 10 43.2	- 1 54.9	6 59 0.5	- 2 49.0	9.5336187	9.9393101	9.9267466	
10	151 17 55.6	4 51 29.5	- 6 9.2	+6 47 13.6	- 8 44.3	9.5473121	9.9141361	9.9015355	
12	160 42 17.3	4 33 3.2	9 27.7	6 24 56.5	13 20.0	9.5611751	9.8890035	9.8766010	
14	169 31 2.6	4 15 57.4	11 39.3	5 54 41.3	16 44.2	9.5748032	9.8643913	9.8524399	
16	177 47 11.9	4 0 28.9	12 43.6	5 18 39.6	19 8.6	9.5878978	9.8408140	9.8295829	
18	185 34 7.3	3 46 43.6	12 46.4	4 38 38.6	20 45.2	9.6002478	9.8188170	9.8085870	
20	192 55 14.6	3 34 40.2	-11 57.5	+3 56 3.3	-21 44.9	9.6117111	9.7989638	9.7900159	
22	199 53 52.7	3 24 13.4	10 27.4	3 11 58.4	22 16.1	9.6221962	9.7818096	9.7744056	
24	206 33 7.9	3 15 16.3	8 26.3	2 27 13.0	22 26.3	9.6316498	9.7678586	9.7622157	
26	212 55 52.8	3 7 41.4	6 4.6	1 42 23.6	22 20.9	9.6400421	9.7575141	9.7537807	
28	219 4 43.5	3 1 21.4	3 30.6	0 57 57.5	22 3.6	9.6473619	9.7510305	9.7492671	
30	225 2 4.1	2 56 10.2	- 0 52.0	+0 14 15.0	-21 37.7	9.6536072	9.7484813	9.7486526	
May 2	230 50 6.1	2 52 1.8	+ 1 44.4	-0 28 28.6	21 5.0	9.6587826	9.7497506	9.7517354	
4	236 30 50.3	2 48 51.6	4 13.5	1 10 1.1	20 26.8	9.6628954	9.7545588	9.7581670	
6	242 6 9.1	2 46 26.0	6 30.6	1 50 12.6	19 44.1	9.6659532	9.7625027	9.7675056	
8	247 37 48.8	2 45 12.2	8 31.6	2 28 54.6	18 57.2	9.6679633	9.7731140	9.7792669	
10	253 7 31.5	2 44 38.7	+10 12.8	-3 5 58.4	-18 6.0	9.6689304	9.7859060	9.7929745	
12	258 36 56.4	2 44 54.2	11 31.1	3 41 15.5	17 10.4	9.6688574	9.8004186	9.8081882	
14	264 7 40.7	2 45 58.2	12 24.1	4 14 36.3	16 9.5	9.6677437	9.8162378	9.8245246	
16	269 41 22.5	2 47 52.0	12 50.1	4 45 49.6	15 2.7	9.6655867	9.8330100	9.8416503	
18	275 19 43.1	2 50 37.0	12 46.6	5 14 42.2	13 48.6	9.6623812	9.8504414	9.8593284	
20	281 4 26.1	2 54 15.2	+12 12.7	-5 40 57.9	-12 25.6	9.6581197	9.8682956	9.8773206	
22	286 57 21.3	2 58 49.8	11 7.8	6 4 17.4	10 51.9	9.6527942	9.8863833	9.8954061	
24	293 0 25.4	3 4 24.6	9 31.8	6 24 16.8	9 5.1	9.6463979	9.9045532	9.9136303	
26	299 15 43.0	3 11 4.2	7 26.2	6 40 27.3	7 2.5	9.6389271	9.9226846	9.9317038	
28	305 45 29.0	3 18 54.0	4 53.6	6 52 14.2	4 41.0	9.6303843	9.9406767	9.9495927	
30	312 32 9.3	3 27 59.3	+ 1 58.6	-6 58 56.0	- 1 56.8	9.6207831	9.9584416	9.9672137	
June 1	319 38 20.6	3 38 25.9	- 1 11.6	6 59 43.6	+ 1 13.8	9.6101563	9.9758991	9.9844874	
3	327 6 50.5	3 50 18.8	4 26.8	6 53 40.4	4 54.7	9.5985615	9.9929680	0.0013309	
5	335 0 35.6	4 3 41.2	7 33.5	6 39 42.7	9 8.7	9.5860970	0.0095644	0.0176558	
7	343 22 35.0	4 18 22.8	10 14.0	6 16 42.4	13 57.4	9.5729126	0.0255915	0.0333570	
9	352 15 42.7	4 34 48.0	-12 7.4	-5 43 31.5	+19 18.5	9.5592309	0.0409370	0.0483146	
11	1 42 33.9	4 52 12.2	12 52.1	4 59 11.7	25 4.5	9.5453651	0.0554713	0.0623875	
13	11 45 3.3	5 10 20.6	12 8.6	4 3 7.5	30 59.3	9.5317346	0.0690419	0.0754130	
15	22 23 57.3	5 28 29.2	9 45.6	2 55 26.3	36 36.1	9.5188753	0.0814775	0.0872113	
17	33 38 21.4	5 45 29.2	5 47.8	1 37 20.4	41 16.9	9.5074225	0.0925909	0.0975921	
19	45 25 4.9	6 0 35.2	- 0 41.9	-0 11 26.1	+44 16.6	9.4980679	0.1021921	0.1063699	
21	57 38 16.5	6 11 53.1	+ 4 42.0	+1 18 9.5	44 59.0	9.4914778	0.1101062	0.1133853	
23	70 9 20.0	6 18 15.6	9 20.3	2 46 7.6	42 36.6	9.4881815	0.1161951	0.1185274	
25	82 47 26.3	6 18 50.1	12 13.7	4 6 42.9	37 32.3	9.4884641	0.1203789	0.1217506	
27	95 20 39.7	6 13 24.5	12 46.5	5 14 46.4	30 12.8	9.4923002	0.1226485	0.1230827	
29	107 37 26.5	6 2 33.0	+10 58.7	+6 6 41.7	+21 34.8	9.4993615	0.1230672	0.1226189	
31	119 28 1.6	5 47 26.7	+ 7 21.7	+6 40 54.2	+12 39.8	9.5090890	0.1217576		

MERCURY.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
July 1	119 28 1.6	5 47 26.7	+ 7 21.7	+6 40 54.2	+12 39.8	9.5090890	0.1217576	0.1205046
3	130 45 23.0	5 29 34.8	+ 2 45.6	6 57 44.0	+ 4 19.1	9.5208061	0.1188823	0.1169134
5	141 25 29.6	5 10 25.6	- 1 59.2	6 58 55.3	- 2 55.0	9.5338253	0.1146211	0.1120273
7	151 27 2.9	4 51 12.2	6 12.7	6 46 57.4	8 49.2	9.5475248	0.1091530	0.1060185
9	160 50 50.8	4 32 46.9	9 30.2	6 24 31.9	13 23.6	9.5613868	0.1026423	0.0990418
11	169 39 4.8	4 15 42.5	-11 40.7	+5 54 10.4	-16 46.6	9.5750091	0.0952332	0.0912305
13	177 54 46.1	4 0 15.6	12 44.1	5 18 4.2	19 10.5	9.5880936	0.0870465	0.0826928
15	185 41 16.3	3 46 31.9	12 46.0	4 38 0.3	20 46.4	9.6004308	0.0781795	0.0735154
17	193 2 1.6	3 34 30.0	11 56.4	3 55 23.1	21 45.4	9.6118797	0.0687085	0.0637655
19	200 0 20.7	3 24 4.5	10 25.7	3 11 17.2	22 16.4	9.6223495	0.0586922	0.0534932
21	206 39 19.5	3 15 8.7	- 8 24.2	+2 26 31.4	-22 26.4	9.6317872	0.0481727	0.0427339
23	213 1 50.2	3 7 35.0	6 2.4	1 41 42.2	22 20.7	9.6401634	0.0371793	0.0315116
25	219 10 29.4	3 1 16.2	3 28.3	0 57 16.7	22 3.3	9.6474669	0.0257322	0.0198417
27	225 7 40.6	2 56 5.8	- 0 49.7	+0 13 34.9	21 37.2	9.6536960	0.0138408	0.0077303
29	230 55 34.8	2 51 58.4	+ 1 46.8	-0 29 7.6	21 4.3	9.6588554	0.0015107	9.9951816
31	236 36 12.9	2 48 49.1	+ 4 15.7	-1 10 38.9	-20 26.1	9.6629520	9.9887430	9.9821949
Aug. 2	242 11 27.4	2 46 34.9	6 32.5	1 50 49.1	19 43.4	9.6659939	9.9755379	9.9687722
4	247 43 4.5	2 45 11.3	8 33.2	2 29 29.6	18 56.4	9.6679879	9.9618987	9.9549183
6	253 12 46.1	2 44 38.5	10 14.1	3 6 31.8	18 5.2	9.6689391	9.9478334	9.9406467
8	258 42 11.2	2 44 54.6	11 32.1	3 41 47.3	17 9.5	9.6688501	9.9333628	9.9259869
10	264 12 57.2	2 45 59.6	+12 24.8	-4 15 6.2	-16 8.5	9.6677205	9.9185261	9.9100896
12	269 46 42.8	2 47 54.3	12 50.2	4 46 17.4	15 1.6	9.6655473	9.9033896	9.8957403
14	275 25 8.4	2 50 39.9	12 46.2	5 15 7.7	13 47.4	9.6623251	9.8880507	9.8803696
16	281 9 58.0	2 54 18.9	12 11.9	5 41 20.9	12 24.3	9.6580470	9.8726967	9.8650721
18	287 3 1.8	2 58 54.4	11 6.5	6 4 37.4	10 50.4	9.6527046	9.8575335	9.8501247
20	293 6 16.1	3 4 30.3	+ 9 30.1	-6 24 33.6	- 9 3.4	9.6462915	9.8428968	9.8359083
22	299 21 46.3	3 11 11.0	7 23.9	6 40 40.3	7 0.5	9.6388037	9.8292259	9.8229244
24	305 51 46.8	3 19 1.8	4 51.0	6 52 22.9	4 38.6	9.6302440	9.8170865	9.8118028
26	312 38 44.0	3 28 8.5	+ 1 55.8	6 58 59.6	- 1 54.0	9.6206264	9.8071695	9.8032872
28	319 45 15.0	3 38 36.4	- 1 14.6	6 59 41.3	+ 1 17.0	9.6099835	9.8002588	9.7981850
30	327 14 7.3	3 50 30.6	- 4 29.8	-6 53 31.2	+ 4 58.4	9.5983740	9.7971611	9.7972729
Sept. 1	335 8 17.4	4 3 54.4	7 36.1	6 39 25.7	9 12.9	9.5858965	9.7985915	9.8011690
3	343 30 44.8	4 18 47.4	10 16.1	6 16 16.5	14 2.0	9.5727021	9.8050350	9.8101937
5	352 24 23.0	4 35 4.0	12 8.7	5 42 55.7	19 23.6	9.5590147	9.8166233	9.8242746
7	1 51 47.1	4 52 29.8	12 52.2	4 58 25.0	25 10.0	9.5451482	9.8330741	9.8429268
9	11 54 50.5	5 10 37.8	-12 7.2	-4 2 9.8	+31 4.9	9.5315254	9.8537188	9.8653229
11	22 34 18.9	5 28 46.2	9 42.6	2 54 18.2	36 41.0	9.5186825	9.8776033	9.8904191
13	33 49 15.4	5 45 54.5	5 43.5	1 36 3.5	41 20.6	9.5072565	9.9036293	9.9170950
15	45 36 26.8	6 0 47.6	- 0 36.8	-0 10 3.7	44 18.4	9.4979398	9.9306842	9.9442724
17	57 49 59.6	6 12 1.7	+ 4 49.9	+1 19 33.1	44 51.3	9.4913971	9.9577456	9.9710017
19	70 21 15.5	6 18 19.1	+ 9 24.0	+2 47 27.0	+42 33.2	9.4881549	9.9839511	9.9965158
21	82 59 23.1	6 18 48.0	12 15.4	4 7 52.9	37 26.4	9.4884934	0.0086350	0.0202560
23	95 32 26.8	6 13 17.0	12 45.9	5 15 42.7	30 5.3	9.4923828	0.0313421	0.0418681
25	107 48 53.8	6 2 20.8	10 56.0	6 7 22.0	21 26.4	9.4994902	0.0518187	0.0611885
27	119 39 0.6	5 47 11.0	7 17.6	6 41 17.7	12 31.6	9.5092544	0.0699800	0.0782025
29	130 55 48.2	5 29 17.2	+ 2 41.2	+6 57 52.0	+ 4 11.8	9.5209975	0.0858702	0.0930017
31	141 35 18.9	5 10 7.4	- 2 3.5	+6 58 49.8	- 3 1.2	9.5340323	0.0996181	

## MERCURY.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Oct. 1	141° 35' 18.9"	5 10 7.4	- 2 3.5	+6 58 49.8	- 3 1.9	9.5340323	0.0996181	0.1057424
3	151 36 16.2	4 50 54.3	6 16.3	6 46 40.9	8 54.1	9.5477385	0.1113982	0.1160099
5	160 59 29.3	4 32 30.1	9 32.8	6 24 6.8	13 27.3	9.5616000	0.1214013	0.1257958
7	169 47 11.2	4 15 27.9	11 42.2	5 53 39.1	16 49.9	9.5752165	0.1298156	0.1334821
9	178 2 23.6	4 0 1.9	12 44.6	5 17 28.5	19 12.3	9.5882914	0.1368157	0.1398341
11	185 48 27.7	3 46 19.9	-12 45.6	+4 37 21.6	-20 47.6	9.6006161	0.1425549	0.1449944
13	193 8 50.4	3 34 19.5	11 55.2	3 54 42.6	21 46.1	9.6120509	0.1471671	0.1490864
15	200 6 50.0	3 23 55.6	10 24.0	3 10 35.8	22 16.7	9.6225054	0.1507643	0.1522122
17	206 45 32.5	3 15 1.1	8 22.5	2 25 49.7	22 26.4	9.6319229	0.1534398	0.1544557
19	213 7 49.1	3 7 28.5	6 0.0	1 41 0.7	22 20.4	9.6402868	0.1552635	0.1558849
21	219 16 16.5	3 1 10.8	- 3 25.9	+0 56 35.7	-22 2.9	9.6475736	0.1563109	0.1565524
23	225 13 17.9	2 56 1.5	- 0 47.3	+0 12 54.8	21 36.6	9.6537862	0.1566136	0.1564984
25	231 1 4.4	2 51 55.0	+ 1 49.2	-0 29 46.7	21 3.8	9.6589287	0.1562099	0.1557507
27	236 41 36.8	2 48 46.6	4 18.0	1 11 16.9	20 25.6	9.6630087	0.1551227	0.1543272
29	242 16 47.1	2 46 32.6	6 34.5	1 51 26.0	19 42.7	9.6660341	0.1533649	0.1522362
31	247 48 21.7	2 45 10.5	+ 8 35.0	-2 30 4.8	-18 55.6	9.6680117	0.1509404	0.1494769
Nov. 2	253 18 2.4	2 44 38.4	10 15.5	3 7 5.5	18 4.4	9.6689468	0.1478440	0.1460394
4	258 47 27.9	2 44 55.9	11 33.1	3 42 19.1	17 8.7	9.6688414	0.1440611	0.1419060
6	264 18 16.0	2 46 1.0	12 25.3	4 15 36.2	16 7.8	9.6676953	0.1395705	0.1370504
8	269 52 4.9	2 47 56.4	12 50.4	4 46 45.3	15 0.5	9.6655058	0.1343411	0.1314376
10	275 30 35.5	2 50 42.8	+12 46.0	-5 15 33.3	-13 46.0	9.6622672	0.1283342	0.1250244
12	281 15 32.0	2 54 22.7	12 11.2	5 41 43.9	12 22.8	9.6579724	0.1215009	0.1177567
14	287 8 44.2	2 58 59.1	11 5.3	6 4 57.5	10 48.8	9.6526134	0.1137833	0.1095718
16	293 12 8.8	3 4 35.9	9 28.4	6 24 50.3	9 1.6	9.6461833	0.1051123	0.1003948
18	299 27 51.3	3 11 17.8	7 21.8	6 40 53.3	6 58.5	9.6386786	0.0954081	0.0901399
20	305 58 6.7	3 19 9.7	+ 4 48.4	-6 52 31.4	- 4 36.2	9.6301022	0.0845780	0.0787094
22	312 45 20.8	3 28 17.5	+ 1 52.8	6 59 3.0	- 1 51.3	9.6204682	0.0725200	0.0659953
24	319 52 11.3	3 38 48.9	- 1 17.6	6 59 38.8	+ 1 20.9	9.6098100	0.0591206	0.0518808
26	327 21 26.1	3 50 42.6	4 32.9	6 53 21.9	5 2.0	9.5981863	0.0442610	0.0362469
28	335 16 1.4	4 4 7.7	7 38.9	6 39 8.5	9 17.2	9.5856959	0.0278253	0.0189847
30	343 38 56.4	4 19 1.9	-10 18.3	-6 15 50.2	+14 6.9	9.5724922	0.0097168	0.0000163
Dec. 2	352 33 5.1	4 35 19.8	12 9.9	5 42 19.5	19 28.9	9.5587993	9.9898810	9.9793230
4	2 1 1.8	4 52 46.5	12 52.2	4 57 38.1	25 15.5	9.5449334	9.9683579	9.9570171
6	12 4 39.2	5 10 55.0	12 5.7	4 1 11.9	31 10.2	9.5313185	9.9453468	9.9334133
8	22 44 41.6	5 29 2.9	9 39.5	2 53 9.8	36 46.9	9.5184923	9.9213075	9.9091480
10	34 0 10.5	5 46 10.0	- 5 39.0	-1 34 45.6	+41 24.4	9.5070941	9.8970849	9.8833030
12	45 47 50.4	6 1 0.2	- 0 31.8	-0 8 41.0	44 19.8	9.4978157	9.8740195	9.8634809
14	58 1 44.3	6 12 10.1	+ 4 51.7	+1 20 56.8	44 50.6	9.4912207	9.8539548	9.8457141
16	70 33 12.0	6 18 22.4	9 27.7	2 48 46.4	42 20.6	9.4881325	9.8390188	9.8340936
18	83 11 20.6	6 18 45.6	12 17.0	4 9 2.7	37 20.4	9.4835272	9.8311047	9.8301438
20	95 44 13.9	6 13 9.1	+12 45.2	+5 16 38.7	+29 57.6	9.4924699	9.8312146	9.8342363
22	108 0 20.3	6 2 8.4	10 53.3	6 8 1.9	21 16.1	9.4996235	9.8390546	9.8454580
24	119 49 58.9	5 46 55.4	7 13.7	6 41 41.0	12 23.7	9.5094238	9.8532006	9.8620247
26	131 6 13.3	5 28 59.7	+ 2 36.7	6 57 59.7	+ 4 4.5	9.5211923	9.8716771	9.8819234
28	141 45 8.1	5 9 49.3	- 2 7.7	6 58 44.0	- 3 7.3	9.5342421	9.8925561	9.9033981
30	151 45 20.4	4 50 36.6	- 6 19.8	+6 46 24.3	- 6 58.9	9.5479546	9.9143021	9.9251510
32	161 8 8.2	4 32 13.3	- 9 35.4	+6 23 41.7	-13 31.0	9.5618155	9.9358524	

VENUS.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan. 0	206 53 45.9	1 36 37.7	- 2 59.4	+2 33 9.6	- 3 45.8	9.8586331	0.1386289	0.1418640
4	213 19 14.9	1 36 16.8	3 0.2	2 17 11.3	4 12.8	9.8589597	0.1450338	0.1481390
8	219 43 59.9	1 36 5.8	2 52.0	1 59 31.4	4 36.5	9.8592905	0.1511802	0.1541575
12	226 8 1.1	1 35 55.0	2 35.2	1 40 23.7	4 56.6	9.8596213	0.1570719	0.1599237
16	232 31 19.8	1 35 44.5	2 10.8	1 20 2.9	5 13.0	9.8599480	0.1627138	0.1654438
20	238 53 57.8	1 35 34.7	- 1 39.9	+0 58 44.4	- 5 25.4	9.8602666	0.1681156	0.1707294
24	245 15 58.0	1 35 25.6	1 4.3	0 36 44.2	5 33.8	9.8605731	0.1732374	0.1757913
28	251 37 23.4	1 35 17.3	- 0 25.5	+0 14 18.8	5 38.1	9.8608638	0.1782419	0.1806401
Feb. 1	257 58 17.8	1 35 10.1	+ 0 14.6	-0 8 15.5	5 38.9	9.8611352	0.1829865	0.1852810
5	264 18 45.7	1 35 4.0	0 53.9	0 30 42.2	5 34.4	9.8613839	0.1875243	0.1897171
9	270 38 51.3	1 34 59.0	+ 1 30.5	-0 52 44.8	- 5 26.3	9.8616070	0.1918589	0.1939493
13	276 58 39.5	1 34 55.2	2 2.6	1 14 7.5	5 14.4	9.8618020	0.1959886	0.1979773
17	283 18 14.7	1 34 52.6	2 28.8	1 34 35.1	4 58.8	9.8619664	0.1999160	0.2018056
21	289 37 41.6	1 34 51.0	2 47.8	1 53 52.8	4 39.5	9.8620984	0.2036470	0.2054413
25	295 57 4.5	1 34 50.6	2 58.6	2 11 46.8	4 16.9	9.8621963	0.2071891	0.2088910
Mar. 1	302 16 27.8	1 34 51.2	+ 3 0.7	-2 28 4.4	- 3 51.3	9.8622590	0.2105474	0.2121586
5	308 35 55.2	1 34 52.6	2 54.0	2 42 33.7	3 22.9	9.8622859	0.2137244	0.2152442
9	314 55 30.1	1 34 54.9	2 38.8	2 55 4.5	2 52.1	9.8622764	0.2167178	0.2181448
13	321 15 15.6	1 34 57.9	2 16.0	3 5 27.6	2 19.1	9.8622309	0.2195244	0.2208561
17	327 35 14.3	1 35 1.5	1 46.6	3 13 35.3	1 44.5	9.8621499	0.2221403	0.2233770
21	333 55 28.6	1 35 5.6	+ 1 12.0	-3 19 21.7	- 1 8.5	9.8620342	0.2245664	0.2257086
25	340 16 0.2	1 35 10.2	+ 0 33.9	3 22 42.3	- 0 31.7	9.8618852	0.2268043	0.2278535
29	346 36 50.9	1 35 15.2	- 0 6.0	3 23 34.4	+ 0 5.6	9.8617049	0.2288569	0.2298138
Apr. 2	352 58 1.9	1 35 20.4	0 45.7	3 21 57.0	0 43.0	9.8614950	0.2307245	0.2315882
6	359 19 34.2	1 35 25.8	1 23.1	3 17 50.6	1 20.0	9.8612584	0.2324041	0.2331714
10	5 41 28.5	1 35 31.4	- 1 56.4	-3 11 18.1	+ 1 56.1	9.8609978	0.2338890	0.2345566
14	12 3 45.8	1 35 37.2	2 24.1	3 2 23.6	2 30.9	9.8607163	0.2351733	0.2357362
18	18 26 26.7	1 35 43.2	2 44.7	2 51 13.3	3 3.9	9.8604174	0.2362507	0.2367117
22	24 49 31.8	1 35 49.4	2 57.2	2 37 54.8	3 34.9	9.8601046	0.2371210	0.2374784
26	31 13 1.8	1 35 55.7	3 0.9	2 22 37.6	4 3.3	9.8597818	0.2377841	0.2380380
30	37 36 57.4	1 36 2.2	- 2 55.6	-2 5 32.5	+ 4 28.7	9.8594530	0.2382401	0.2383896
May 4	44 1 19.4	1 36 8.9	2 41.7	1 46 52.0	4 50.9	9.8591221	0.2384860	0.2385284
8	50 26 8.4	1 36 15.7	2 19.6	1 26 49.6	5 9.6	9.8587935	0.2385157	0.2384467
12	56 51 25.1	1 36 22.7	1 50.5	1 5 40.1	5 24.4	9.8584712	0.2383207	0.2381370
16	63 17 10.0	1 36 29.8	1 15.8	0 43 39.2	5 35.3	9.8581592	0.2378948	0.2375938
20	69 43 23.6	1 36 37.0	- 0 37.2	-0 21 3.4	+ 5 41.9	9.8578616	0.2372339	0.2368151
24	76 10 6.2	1 36 44.3	+ 0 3.3	+0 1 50.1	5 44.1	9.8575822	0.2363374	0.2358011
28	82 37 17.8	1 36 51.5	0 43.6	0 24 43.9	5 42.1	9.8573245	0.2352064	0.2345528
June 1	89 4 57.8	1 36 58.5	1 21.8	0 47 20.4	5 35.5	9.8570920	0.2338401	0.2330675
5	95 33 5.4	1 37 5.2	1 55.9	1 9 22.1	5 24.6	9.8568876	0.2322345	0.2313402
9	102 1 39.2	1 37 11.5	+ 2 24.1	+1 30 31.9	+ 5 9.6	9.8567142	0.2303839	0.2293634
13	108 30 37.2	1 37 17.3	2 45.0	1 50 33.2	4 50.4	9.8565739	0.2282796	0.2271316
17	114 59 56.8	1 37 22.4	2 57.5	2 9 10.4	4 27.5	9.8564685	0.2259192	0.2246424
21	121 29 34.9	1 37 28.6	3 0.9	2 26 8.7	4 1.1	9.8563996	0.2233013	0.2218964
25	127 59 27.8	1 37 29.7	2 55.0	2 41 14.8	3 31.4	9.8563681	0.2204283	0.2188968
29	134 29 31.0	1 37 31.7	+ 2 40.2	+2 54 16.7	+ 2 59.1	9.8563743	0.2173024	0.2156442
July 3	140 59 39.7	1 37 32.4	+ 2 17.1	+3 5 4.3	+ 2 24.4	9.8564180	0.2139226	



## VENUS.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
July 3	140 59 39.7	1 37 32.4	+ 2 17.1	+3 5 4.3	+ 2 24.4	9.8564180	0.2139226	0.2121370
7	147 29 48.7	1 37 31.8	1 47.1	3 13 29.2	1 47.8	9.8564990	0.2102863	0.2083701
11	153 59 52.5	1 37 29.8	1 11.5	3 19 24.8	1 9.8	9.8566160	0.2063875	0.2043380
15	160 29 45.4	1 37 26.4	+ 0 32.4	3 22 46.8	+ 0 31.0	9.8567676	0.2022212	0.2000373
19	166 59 22.0	1 37 21.6	- 0 8.4	3 23 32.8	- 0 8.0	9.8569514	0.1977867	0.1954693
23	173 28 36.8	1 37 15.5	- 0 48.8	+3 21 42.7	- 0 46.9	9.8571655	0.1930857	0.1906366
27	179 57 24.5	1 37 8.9	1 26.6	3 17 18.2	1 25.1	9.8574068	0.1881223	0.1855429
31	186 25 40.5	1 36 59.8	1 59.9	3 10 23.7	2 2.0	9.8576721	0.1828984	0.1801884
Aug. 4	192 53 20.9	1 36 50.4	2 27.2	3 1 4.5	2 37.2	9.8579583	0.1774126	0.1745696
8	199 20 22.3	1 36 40.2	2 47.0	2 49 28.7	3 10.3	9.8582613	0.1716594	0.1686808
12	205 46 42.1	1 36 29.7	- 2 58.3	+2 35 45.7	- 3 40.8	9.8585775	0.1656332	0.1625160
16	212 12 18.6	1 36 18.7	3 0.6	2 20 6.4	4 8.3	9.8589027	0.1593289	0.1560723
20	218 37 11.3	1 36 7.7	2 54.1	2 2 43.4	4 38.6	9.8592328	0.1527461	0.1493505
24	225 1 20.3	1 35 56.8	2 38.8	1 43 50.0	4 53.4	9.8595637	0.1458860	0.1423530
28	231 24 46.3	1 35 46.3	2 15.6	1 23 40.8	5 10.5	9.8598912	0.1387510	0.1350796
Sept. 1	237 47 31.2	1 35 36.3	- 1 45.7	+1 2 31.3	- 5 23.6	9.8602112	0.1313381	0.1275257
5	244 9 37.7	1 35 27.1	1 10.7	0 40 37.3	5 32.7	9.8605199	0.1236410	0.1196825
9	250 31 9.0	1 35 18.7	- 0 32.3	+0 18 15.0	5 37.7	9.8608135	0.1156490	0.1115391
13	256 52 8.6	1 35 11.3	+ 0 7.7	-0 4 18.9	5 38.5	9.8610882	0.1073514	0.1030854
17	263 12 40.9	1 35 5.0	0 47.2	0 26 48.0	5 35.3	9.8613409	0.0987403	0.0943156
21	269 32 50.2	1 34 59.8	+ 1 24.4	-0 48 56.1	- 5 28.0	9.8615685	0.0898109	0.0852257
25	275 52 41.1	1 34 55.8	1 57.5	1 10 27.0	5 16.8	9.8617684	0.0805596	0.0758116
29	282 12 18.4	1 34 53.0	2 24.8	1 31 5.2	5 1.7	9.8619380	0.0709805	0.0660647
Oct. 3	288 31 46.5	1 34 51.3	2 45.1	1 50 36.2	4 43.1	9.8620755	0.0610626	0.0559708
7	294 51 10.1	1 34 50.6	2 57.2	2 8 46.0	4 21.1	9.8621792	0.0507874	0.0455099
11	301 10 33.2	1 34 51.0	+ 3 0.9	-2 25 21.1	- 3 55.9	9.8622479	0.0401353	0.0346614
15	307 29 59.8	1 34 52.4	2 55.8	2 40 10.1	3 28.0	9.8622807	0.0290863	0.0234079
19	313 49 33.4	1 34 54.5	2 42.1	2 53 2.3	2 57.6	9.8622773	0.0176247	0.0117349
23	320 9 17.0	1 34 57.4	2 20.6	3 3 48.3	2 25.0	9.8622378	0.0057366	9.9996291
27	326 29 13.7	1 35 1.0	1 52.1	3 12 20.2	1 50.6	9.8621626	9.9934093	9.9870741
31	332 49 25.5	1 35 5.0	+ 1 18.3	-3 18 31.7	- 1 14.9	9.8620525	9.9806211	9.9740465
Nov. 4	339 9 54.5	1 35 9.5	0 40.6	3 22 18.0	0 38.1	9.8619069	9.9673461	9.9605154
8	345 30 42.2	1 35 14.4	+ 0 0.9	3 23 36.1	- 0 0.8	9.8617336	9.9535504	9.9464456
12	351 51 49.9	1 35 19.6	- 0 38.9	3 22 24.8	+ 0 36.5	9.8615285	9.9391972	9.9318011
16	358 13 18.8	1 35 25.0	1 16.7	3 18 44.3	1 13.6	9.8612961	9.9242541	9.9165520
20	4 35 9.9	1 35 30.6	- 1 51.0	-3 12 37.0	+ 1 49.9	9.8610393	9.9086917	9.9006699
24	10 57 23.8	1 35 36.4	2 19.8	3 4 6.9	2 24.9	9.8607611	9.8924833	9.8841274
28	17 20 1.1	1 35 42.3	2 41.7	2 53 19.7	2 58.4	9.8604648	9.8755972	9.8668887
Dec. 2	23 43 2.4	1 35 48.6	2 55.6	2 40 23.0	3 29.6	9.8601541	9.8579952	9.8489098
6	30 6 28.7	1 35 54.7	3 0.9	2 25 25.7	3 58.5	9.8598327	9.8396265	9.8301387
10	36 30 20.5	1 36 1.2	- 2 57.2	-2 8 38.6	+ 4 24.5	9.8595047	9.8204383	9.8105217
14	42 54 38.5	1 36 7.8	2 44.7	1 50 13.7	4 47.3	9.8591740	9.8003819	9.7900147
18	49 19 23.3	1 36 14.6	2 24.0	1 30 24.5	5 6.6	9.8588448	9.7794166	9.7685844
22	55 44 35.7	1 36 21.6	1 56.0	1 9 25.5	5 22.2	9.8585212	9.7575162	9.7462106
26	62 10 16.2	1 36 28.7	1 22.1	0 47 32.4	5 33.7	9.8582074	9.7346656	9.7228797
30	68 36 25.3	1 36 35.9	- 0 44.1	-0 25 1.5	+ 5 41.0	9.8579073	9.7108536	9.6985866
34	75 3 3.4	1 36 43.2	- 0 3.8	-0 2 9.8	+ 5 44.1	9.8576249	9.6860813	

MARS.								
GREENWICH MEAN NOON.								
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							At Date.	At Interme- diate Date.
Jan. 0	296 45 17.8	36 47.69	+37.4	-1 43 0.9	-26.56	0.1478979	0.3738073	0.3739422
4	299 12 48.0	36 57.39	33.8	1 44 41.7	23.80	0.1469487	0.3740675	0.3741833
8	301 40 56.2	37 6.60	30.2	1 46 11.3	20.06	0.1460547	0.3742894	0.3743864
12	304 9 40.1	37 15.94	26.1	1 47 29.4	18.06	0.1452182	0.3744747	0.3745530
16	306 38 57.3	37 23.30	21.9	1 48 35.8	15.06	0.1444413	0.3746216	0.3746814
20	309 8 45.7	37 30.79	+17.5	-1 49 29.9	-12.06	0.1437250	0.3747319	0.3747744
24	311 39 2.7	37 37.56	13.0	1 50 11.8	8.89	0.1430743	0.3748094	0.3748374
28	314 9 45.3	37 43.64	8.5	1 50 41.0	5.73	0.1424878	0.3748593	0.3748758
Feb. 1	316 40 50.9	37 49.09	+ 3.8	1 50 57.6	- 2.54	0.1419682	0.3748868	0.3748930
5	319 12 17.1	37 53.81	- 1.0	1 51 1.3	+ 0.70	0.1415170	0.3748941	0.3748901
9	321 44 0.5	37 57.80	- 5.7	-1 50 52.0	+ 3.94	0.1411351	0.3748805	0.3748654
13	324 15 58.5	38 1.05	10.5	1 50 29.8	7.19	0.1408238	0.3748443	0.3748172
17	326 48 7.9	38 3.56	15.0	1 49 54.5	10.44	0.1405840	0.3747841	0.3747455
21	329 20 26.0	38 5.30	19.6	1 49 6.3	13.68	0.1404162	0.3747017	0.3746532
25	331 52 49.3	38 6.96	24.0	1 48 5.2	16.86	0.1403211	0.3746005	0.3745438
Mar. 1	334 25 15.1	38 6.42	-22.2	-1 46 51.4	+20.02	0.1402925	0.3744835	0.3744197
5	336 57 39.7	38 5.81	32.1	1 45 25.0	23.15	0.1403488	0.3743524	0.3742809
9	339 30 0.6	38 4.49	35.9	1 43 46.2	26.21	0.1404719	0.3742051	0.3741242
13	342 2 14.6	38 2.35	39.2	1 41 55.3	29.21	0.1406675	0.3740380	0.3739457
17	344 34 18.4	37 59.49	42.4	1 39 52.5	32.14	0.1409349	0.3738474	0.3737430
21	347 6 9.5	37 55.84	-45.2	-1 37 38.2	+34.97	0.1412734	0.3736323	0.3735159
25	349 37 44.2	37 51.44	47.6	1 35 12.7	37.71	0.1416821	0.3733937	0.3732661
29	352 9 0.1	37 46.39	49.6	1 32 36.5	40.35	0.1421596	0.3731332	0.3729948
Apr. 2	354 39 54.4	37 40.61	51.2	1 29 49.9	42.87	0.1427048	0.3728509	0.3727008
6	357 10 24.1	37 34.16	52.6	1 26 53.5	45.29	0.1433164	0.3725439	0.3723794
10	359 40 26.8	37 27.07	-53.4	-1 23 47.6	+47.59	0.1439927	0.3722066	0.3720256
14	2 9 59.8	37 19.34	53.9	1 20 32.8	49.73	0.1447317	0.3718336	0.3716324
18	4 39 0.7	37 11.01	53.9	1 17 9.6	51.77	0.1455315	0.3714209	0.3711994
22	7 7 27.1	37 2.09	53.5	1 13 38.6	53.69	0.1463905	0.3709677	0.3707267
26	9 35 16.7	36 52.62	52.8	1 10 0.1	55.45	0.1473061	0.3704738	0.3702115
30	12 2 27.4	36 42.69	-51.6	-1 6 15.0	+57.06	0.1482757	0.3699383	0.3696541
May 4	14 28 57.5	36 32.96	50.1	1 2 23.6	58.55	0.1492975	0.3693575	0.3690485
8	16 54 44.9	36 21.37	48.2	0 58 26.6	59.89	0.1503689	0.3687253	0.3683888
12	19 19 47.9	36 10.05	46.1	0 54 24.5	61.07	0.1514871	0.3680353	0.3676637
16	21 44 4.8	35 58.40	43.5	0 50 18.0	62.19	0.1526496	0.3672771	0.3668735
20	24 7 34.6	35 46.44	-40.7	-0 46 7.5	+63.05	0.1538540	0.3664529	0.3660148
24	26 30 15.8	35 34.09	37.7	0 41 53.6	63.82	0.1550973	0.3655595	0.3650864
28	28 52 6.8	35 21.50	34.3	0 37 36.9	64.45	0.1563770	0.3645957	0.3640860
June 1	31 13 7.4	35 8.67	30.9	0 33 18.0	64.96	0.1576903	0.3635572	0.3630071
5	33 33 15.8	34 55.60	27.1	0 28 57.2	65.34	0.1590346	0.3624368	0.3618435
9	35 52 31.8	34 42.40	-23.3	-0 24 35.3	+65.57	0.1604068	0.3612265	0.3605853
13	38 10 54.7	34 29.00	19.3	0 20 12.6	65.70	0.1618045	0.3599187	0.3592268
17	40 28 23.5	34 15.47	15.2	0 15 49.7	65.70	0.1632249	0.3585090	0.3577649
21	42 44 58.3	34 1.87	11.1	0 11 27.0	65.60	0.1646652	0.3569947	0.3561977
25	45 0 38.3	33 48.17	6.9	0 7 4.9	65.37	0.1661231	0.3553740	0.3545225
29	47 15 23.6	33 34.46	- 2.7	-0 2 44.0	+65.04	0.1675958	0.3536431	0.3527341
July 3	49 29 13.9	33 20.72	+ 1.6	+0 1 35.4	+64.61	0.1690806	0.3517943	

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							At Date.	At Intermediate Date.
July	3	49 29 13.9	33 30.72	+ 1.6	+0 1 35.4	+64.61	0.1090806	0.3517943
	7	51 42 9.4	33 6.99	5.7	0 5 52.9	64.09	0.1705751	0.3498196
	11	53 54 9.9	32 53.29	9.8	0 10 8.1	63.47	0.1720772	0.3477072
	15	56 5 15.9	32 29.67	13.7	0 14 20.7	62.76	0.1735841	0.3454543
	19	58 15 27.3	32 26.06	17.7	0 18 30.2	61.97	0.1750936	0.3430560
	23	60 24 44.6	32 19.61	+21.5	+0 22 36.5	+61.11	0.1766037	0.3405105
	27	62 33 8.4	31 59.30	25.1	0 26 39.1	60.17	0.1781120	0.3378133
	31	64 40 30.2	31 46.10	28.6	0 30 37.9	59.17	0.1796164	0.3349570
	Aug. 4	66 47 17.4	31 33.04	31.9	0 34 32.5	58.11	0.1811146	0.3319319
	8	68 53 3.8	31 30.15	34.9	0 38 22.8	56.99	0.1826050	0.3287275
	12	70 57 58.9	31 7.45	+37.9	+0 42 8.4	+55.80	0.1840857	0.3253306
	16	73 2 3.7	30 54.90	40.5	0 45 49.2	54.57	0.1855547	0.3217543
	20	75 5 18.4	30 42.54	43.0	0 49 25.0	53.29	0.1870103	0.3179775
	24	77 7 44.3	30 30.44	45.2	0 52 55.5	51.96	0.1884509	0.3140017
	28	79 9 22.2	30 18.55	47.1	0 56 20.7	50.60	0.1898749	0.3098193
	Sept. 1	81 10 13.0	30 6.85	+48.8	+0 59 40.3	+49.21	0.1912804	0.3054191
	5	83 10 17.4	29 55.40	50.3	1 2 54.4	47.79	0.1926664	0.3007900
	9	85 9 36.6	29 44.20	51.5	1 6 2.6	46.31	0.1940313	0.2959223
	13	87 8 11.4	29 33.25	52.5	1 9 4.9	44.82	0.1953738	0.2908007
	17	89 6 3.0	29 22.59	53.3	1 12 1.2	43.32	0.1966924	0.2854478
	21	91 3 12.5	29 12.90	+53.7	+1 14 51.5	+41.80	0.1979860	0.2798321
	25	92 50 41.0	29 2.05	53.9	1 17 35.6	40.34	0.1992535	0.2739545
	29	94 55 29.3	28 52.16	53.9	1 20 13.4	38.86	0.2004941	0.2678024
	Oct. 3	96 50 38.8	28 42.60	53.6	1 22 44.9	37.09	0.2017062	0.2613630
	7	98 45 10.6	28 33.30	53.1	1 25 10.1	35.49	0.2028892	0.2546245
	11	100 39 5.7	28 24.30	+52.3	+1 27 28.8	+33.89	0.2040420	0.2475787
	15	102 32 25.5	28 15.56	51.3	1 29 41.2	32.37	0.2051638	0.2402208
	19	104 25 10.7	28 7.19	50.2	1 31 47.0	30.66	0.2062538	0.2325457
	23	106 17 23.0	27 58.99	48.7	1 33 46.5	29.02	0.2073108	0.2245442
	27	108 9 3.1	27 51.14	47.1	1 35 39.2	27.37	0.2083345	0.2162036
	31	110 0 12.6	27 43.00	+45.4	+1 37 25.5	+25.76	0.2093240	0.2075098
	Nov. 4	111 50 52.4	27 36.36	43.4	1 39 5.3	24.11	0.2102789	0.1984490
	8	113 41 3.9	27 29.42	41.3	1 40 38.4	22.49	0.2111985	0.1890127
	12	115 30 48.2	27 22.77	39.0	1 42 5.2	20.86	0.2120522	0.1791966
	16	117 20 6.5	27 16.40	36.6	1 43 25.3	19.21	0.2129292	0.1689962
	20	119 8 59.8	27 10.39	+33.9	+1 44 38.9	+17.59	0.2137393	0.1584063
	24	120 57 20.5	27 4.59	31.2	1 45 46.0	15.94	0.2145119	0.1474150
	28	122 45 36.9	26 59.14	28.5	1 46 46.4	14.32	0.2152466	0.1360104
	Dec. 2	124 33 23.0	26 54.00	25.5	1 47 40.6	12.72	0.2159430	0.1241822
	6	126 20 49.3	26 49.16	22.4	1 48 28.2	11.09	0.2166004	0.1119278
	10	128 7 56.6	26 44.57	+19.4	+1 49 9.3	+ 9.46	0.2172190	0.0992514
	14	129 54 46.3	26 40.31	16.2	1 49 43.9	7.86	0.2177982	0.0861628
	18	131 41 19.5	26 36.35	13.0	1 50 12.2	6.27	0.2183378	0.0726690
	22	133 27 37.5	26 32.73	9.8	1 50 34.1	4.66	0.2188377	0.0587790
	26	135 13 41.6	26 29.37	6.5	1 50 49.5	3.07	0.2192971	0.0444998
	30	136 59 32.8	26 26.37	+ 3.2	+1 50 58.7	+ 1.50	0.2197162	0.0298509
	34	138 45 12.1	26 23.46	- 0.2	+1 51 1.5	- 0.09	0.2200946	0.0148657

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Jan. 0	147 0 17.6	4 40.32	+27.0	+0 58 11.7	+4.30	0.7302218	0.6769782	0.6746230
4	147 18 58.3	4 40.11	27.0	0 58 28.8	4.27	0.7303073	0.6723192	0.6700711
8	147 37 38.5	4 40.00	27.0	0 58 45.9	4.25	0.7303923	0.6678835	0.6657608
12	147 56 18.3	4 39.90	26.9	0 59 2.8	4.22	0.7304770	0.6637078	0.6617291
16	148 14 57.7	4 39.79	26.9	0 59 19.6	4.19	0.7305612	0.6598294	0.6580136
20	148 33 36.6	4 39.69	+26.8	+0 59 36.3	+4.16	0.7306449	0.6562855	0.6546495
24	148 52 15.2	4 39.58	26.8	0 59 53.0	4.14	0.7307282	0.6531091	0.6516683
28	149 10 53.3	4 39.48	26.7	1 0 9.4	4.11	0.7308109	0.6503301	0.6490976
Feb. 1	149 29 31.0	4 39.37	26.7	1 0 25.8	4.08	0.7308932	0.6479738	0.6469616
5	149 48 8.3	4 39.27	26.6	1 0 42.1	4.05	0.7309750	0.6460636	0.6452825
9	150 6 45.2	4 39.16	+26.6	+1 0 58.3	+4.02	0.7310563	0.6446203	0.6440795
13	150 25 21.6	4 39.06	26.5	1 1 14.3	3.99	0.7311372	0.6436613	0.6433674
17	150 43 57.6	4 38.96	26.5	1 1 30.2	3.96	0.7312175	0.6431979	0.6431534
21	151 2 33.2	4 38.86	26.4	1 1 46.0	3.93	0.7312972	0.6432344	0.6434396
25	151 21 8.5	4 38.76	26.3	1 2 1.7	3.91	0.7313764	0.6437678	0.6442183
Mar. 1	151 39 43.3	4 38.66	+26.2	+1 2 17.3	+3.88	0.7314551	0.6447894	0.6454795
5	151 58 17.7	4 38.57	26.1	1 2 32.8	3.85	0.7315333	0.6462868	0.6472093
9	152 16 51.8	4 38.47	26.1	1 2 48.1	3.82	0.7316110	0.6482444	0.6493900
13	152 35 25.4	4 38.37	26.0	1 3 3.4	3.79	0.7316881	0.6506428	0.6520003
17	152 53 58.7	4 38.27	25.9	1 3 18.5	3.77	0.7317648	0.6534583	0.6550133
21	153 12 31.6	4 38.17	+25.8	+1 3 33.5	+3.74	0.7318409	0.6566610	0.6583975
25	153 31 4.1	4 38.07	25.7	1 3 48.4	3.71	0.7319164	0.6602184	0.6621193
29	153 49 36.1	4 37.97	25.6	1 4 3.1	3.68	0.7319915	0.6640959	0.6661439
Apr. 2	154 8 7.8	4 37.88	25.5	1 4 17.8	3.65	0.7320660	0.6682593	0.6704379
6	154 26 39.2	4 37.79	25.4	1 4 32.3	3.62	0.7321400	0.6726756	0.6749683
10	154 45 10.1	4 37.69	+25.3	+1 4 46.8	+3.59	0.7322135	0.6773119	0.6797022
14	155 3 40.8	4 37.60	25.2	1 5 1.1	3.56	0.7322864	0.6821350	0.6846059
18	155 22 11.0	4 37.51	25.1	1 5 15.3	3.53	0.7323583	0.6871106	0.6896446
22	155 40 40.9	4 37.42	25.0	1 5 29.3	3.50	0.7324307	0.6922042	0.6947854
26	155 59 10.4	4 37.33	24.9	1 5 43.3	3.47	0.7325021	0.6973847	0.6999981
30	156 17 39.5	4 37.24	+24.7	+1 5 57.1	+3.44	0.7325729	0.7026229	0.7052559
May 4	156 36 8.3	4 37.15	24.6	1 6 10.8	3.41	0.7326432	0.7078940	0.7105340
8	156 54 36.7	4 37.06	24.5	1 6 24.4	3.38	0.7327130	0.7131733	0.7158091
12	157 13 4.7	4 36.97	24.4	1 6 37.9	3.35	0.7327823	0.7184386	0.7210587
16	157 31 32.5	4 36.89	24.3	1 6 51.3	3.32	0.7328510	0.7236669	0.7262603
20	157 49 59.8	4 36.80	+24.1	+1 7 4.5	+3.29	0.7329192	0.7288367	0.7313937
24	158 8 26.8	4 36.72	24.0	1 7 17.6	3.26	0.7329869	0.7339294	0.7364413
28	158 26 53.6	4 36.64	23.8	1 7 30.6	3.23	0.7330541	0.7389283	0.7413888
June 1	158 45 19.9	4 36.55	23.7	1 7 43.5	3.20	0.7331207	0.7438211	0.7462233
5	159 3 46.0	4 36.47	23.6	1 7 56.3	3.17	0.7331867	0.7485943	0.7509328
9	159 22 11.7	4 36.38	+23.4	+1 8 8.9	+3.14	0.7332522	0.7532374	0.7555065
13	159 40 37.0	4 36.30	23.3	1 8 21.4	3.11	0.7333172	0.7577386	0.7599320
17	159 59 2.0	4 36.22	23.1	1 8 33.8	3.08	0.7333817	0.7620857	0.7641986
21	160 17 26.7	4 36.14	22.9	1 8 46.1	3.05	0.7334456	0.7662699	0.7682985
25	160 35 51.2	4 36.06	22.8	1 8 58.3	3.02	0.7335089	0.7702838	0.7722252
29	160 54 15.2	4 35.98	+22.6	+1 9 10.3	+2.99	0.7335717	0.7741220	0.7759739
July 3	161 12 39.0	4 35.91	+22.5	+1 9 22.2	+2.96	0.7336339	0.7777799	

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June 20	160 54 15.2	4 35.98	+22.6	+1 9 10.3	+2.99	0.7335717	0.7741920	0.7759739	
July 3	161 12 39.0	4 35.91	22.5	1 9 22.2	2.98	0.7336339	0.7777799	0.7795303	
7	161 31 2.5	4 35.83	22.3	1 9 34.0	2.98	0.7336956	0.7812514	0.7829155	
11	161 49 25.7	4 35.75	22.1	1 9 45.7	2.90	0.7337567	0.7845309	0.7860968	
15	162 7 48.5	4 35.68	22.0	1 9 57.2	2.87	0.7338173	0.7876127	0.7890779	
19	162 26 11.1	4 35.60	+21.8	+1 10 8.6	+2.84	0.7338774	0.7904921	0.7918554	
23	162 44 33.3	4 35.52	21.7	1 10 19.9	2.81	0.7339369	0.7931662	0.7944257	
27	163 2 55.3	4 35.44	21.5	1 10 31.1	2.78	0.7339958	0.7956332	0.7967887	
31	163 21 16.9	4 35.37	21.3	1 10 42.1	2.74	0.7340542	0.7978918	0.7989420	
Aug. 4	163 39 38.2	4 35.30	21.1	1 10 53.1	2.71	0.7341121	0.7999390	0.8008824	
8	163 57 59.3	4 35.23	+21.0	+1 11 3.8	+2.68	0.7341694	0.8017718	0.8026066	
12	164 16 20.1	4 35.16	20.8	1 11 14.5	2.65	0.7342261	0.8033867	0.8041115	
16	164 34 40.6	4 35.09	20.6	1 11 25.0	2.62	0.7342823	0.8047812	0.8053953	
20	164 53 0.8	4 35.02	20.4	1 11 35.5	2.59	0.7343379	0.8059541	0.8064575	
24	165 11 20.8	4 34.95	20.2	1 11 45.7	2.56	0.7343930	0.8069056	0.8072983	
28	165 29 40.4	4 34.88	+20.0	+1 11 55.9	+2.53	0.7344475	0.8076354	0.8079169	
Sept. 1	165 47 59.8	4 34.81	19.8	1 12 5.9	2.49	0.7345014	0.8081423	0.8083113	
5	166 6 18.9	4 34.74	19.6	1 12 15.9	2.46	0.7345548	0.8084237	0.8084794	
9	166 24 37.8	4 34.68	19.4	1 12 25.7	2.43	0.7346076	0.8084782	0.8084196	
13	166 42 56.3	4 34.61	19.2	1 12 35.3	2.40	0.7346598	0.8083038	0.8081308	
17	167 1 14.7	4 34.55	+19.0	+1 12 44.9	+2.37	0.7347115	0.8079008	0.8076139	
21	167 19 32.7	4 34.49	18.8	1 12 54.3	2.34	0.7347626	0.8072703	0.8068700	
25	167 37 50.6	4 34.43	18.6	1 13 3.6	2.31	0.7348131	0.8064131	0.8058998	
29	167 56 8.2	4 34.36	18.4	1 13 12.7	2.28	0.7348631	0.8053296	0.8047021	
Oct. 3	168 14 25.5	4 34.30	18.2	1 13 21.8	2.24	0.7349124	0.8040174	0.8032756	
7	168 32 42.6	4 34.24	+18.0	+1 13 30.7	+2.21	0.7349612	0.8024767	0.8016206	
11	168 50 59.4	4 34.18	17.7	1 13 39.5	2.18	0.7350094	0.8007077	0.7997380	
15	169 9 16.0	4 34.12	17.5	1 13 48.2	2.15	0.7350571	0.7987119	0.7976300	
19	169 27 32.4	4 34.06	17.3	1 13 56.7	2.11	0.7351042	0.7964925	0.7952995	
23	169 45 48.5	4 34.01	17.1	1 14 5.1	2.08	0.7351507	0.7940515	0.7927493	
27	170 4 4.4	4 33.95	+16.8	+1 14 13.4	+2.05	0.7351966	0.7913926	0.7899813	
31	170 22 20.1	4 33.90	16.6	1 14 21.5	2.02	0.7352420	0.7885158	0.7869965	
Nov. 4	170 40 35.6	4 33.84	16.4	1 14 29.5	1.99	0.7352867	0.7854238	0.7837978	
8	170 58 50.9	4 33.79	16.1	1 14 37.4	1.96	0.7353308	0.7821195	0.7803896	
12	171 17 5.9	4 33.73	15.9	1 14 45.2	1.92	0.7353744	0.7786089	0.7767784	
16	171 35 20.7	4 33.68	+15.7	+1 14 52.8	+1.89	0.7354174	0.7748989	0.7720713	
20	171 53 35.3	4 33.62	15.4	1 15 0.3	1.86	0.7354597	0.7709966	0.7689756	
24	172 11 49.7	4 33.56	15.2	1 15 7.7	1.83	0.7355015	0.7669092	0.7647980	
28	172 30 3.8	4 33.51	15.0	1 15 15.0	1.80	0.7355426	0.7626432	0.7604456	
Dec. 2	172 48 17.8	4 33.47	14.7	1 15 22.1	1.76	0.7355831	0.7582067	0.7559275	
6	173 6 31.6	4 33.42	+14.5	+1 15 29.1	+1.73	0.7356230	0.7536098	0.7512553	
10	173 24 45.1	4 33.37	14.3	1 15 36.0	1.70	0.7356624	0.7488059	0.7464432	
14	173 42 58.5	4 33.32	14.0	1 15 42.7	1.67	0.7357011	0.7439894	0.7415064	
18	174 1 11.7	4 33.26	13.8	1 15 49.3	1.64	0.7357392	0.7389964	0.7364614	
22	174 19 24.7	4 33.23	13.5	1 15 55.8	1.60	0.7357767	0.7339033	0.7313240	
26	174 37 37.5	4 33.18	+13.3	+1 16 2.2	+1.57	0.7358136	0.7287261	0.7261118	
30	174 55 50.1	4 33.13	+13.0	+1 16 8.4	+1.54	0.7358499	0.7234838	0.7208446	

SATURN.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radia Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan. 0	81° 27' 53.8"	2 14.40	-1 26.5	-1° 17' 28.3"	+5.00	0.9558992	0.9090368	0.9097103
4	81 36 51.5	2 14.41	1 26.3	1 17 8.3	5.00	0.9558880	0.9104445	0.9112380
8	81 45 49.1	2 14.42	1 26.1	1 16 48.3	5.01	0.9558769	0.9120893	0.9129970
12	81 54 46.8	2 14.42	1 25.8	1 16 28.2	5.02	0.9558660	0.9139593	0.9149744
16	82 3 44.5	2 14.43	1 25.6	1 16 8.2	5.02	0.9558552	0.9160403	0.9171552
20	82 12 42.2	2 14.43	-1 25.3	-1 15 48.0	+5.03	0.9558446	0.9183167	0.9195225
24	82 21 40.0	2 14.44	1 25.1	1 15 27.9	5.04	0.9558341	0.9207702	0.9220575
28	82 30 37.7	2 14.44	1 24.8	1 15 7.7	5.05	0.9558238	0.9233822	0.9247418
Feb. 1	82 39 35.5	2 14.45	1 24.6	1 14 47.5	5.06	0.9558136	0.9261347	0.9275576
5	82 48 33.3	2 14.45	1 24.3	1 14 27.3	5.06	0.9558036	0.9290095	0.9304876
9	82 57 31.1	2 14.45	-1 24.1	-1 14 7.0	+5.07	0.9557938	0.9319898	0.9335140
13	83 6 29.0	2 14.46	1 23.8	1 13 46.7	5.08	0.9557841	0.9350576	0.9366183
17	83 15 26.8	2 14.46	1 23.6	1 13 26.4	5.09	0.9557745	0.9381937	0.9397814
21	83 24 24.7	2 14.47	1 23.3	1 13 6.0	5.09	0.9557651	0.9413793	0.9429851
25	83 33 22.6	2 14.47	1 23.0	1 12 45.6	5.10	0.9557559	0.9445969	0.9462120
Mar. 1	83 42 20.5	2 14.48	-1 22.8	-1 12 25.2	+5.11	0.9557468	0.9478296	0.9494469
5	83 51 18.4	2 14.48	1 22.5	1 12 4.7	5.12	0.9557378	0.9510624	0.9526745
9	84 0 16.4	2 14.49	1 22.2	1 11 44.2	5.12	0.9557290	0.9542814	0.9558813
13	84 9 14.4	2 14.49	1 21.9	1 11 23.7	5.13	0.9557204	0.9574725	0.9590531
17	84 18 12.4	2 14.50	1 21.7	1 11 3.2	5.14	0.9557119	0.9606216	0.9621762
21	84 27 10.4	2 14.50	-1 21.4	-1 10 42.6	+5.15	0.9557036	0.9637153	0.9652373
25	84 36 8.4	2 14.51	1 21.1	1 10 22.0	5.15	0.9556954	0.9667410	0.9682249
29	84 45 6.4	2 14.51	1 20.8	1 10 1.3	5.16	0.9556874	0.9696880	0.9711293
Apr. 2	84 54 4.5	2 14.51	1 20.5	1 9 40.7	5.17	0.9556795	0.9725477	0.9739421
6	85 3 2.6	2 14.52	1 20.2	1 9 20.0	5.17	0.9556718	0.9753115	0.9766548
10	85 12 0.6	2 14.52	-1 19.9	-1 8 59.2	+5.18	0.9556643	0.9779709	0.9792588
14	85 20 58.7	2 14.52	1 19.6	1 8 38.5	5.19	0.9556569	0.9805176	0.9817462
18	85 29 56.8	2 14.53	1 19.3	1 8 17.7	5.20	0.9556496	0.9829437	0.9841092
22	85 38 55.0	2 14.53	1 19.0	1 7 56.9	5.21	0.9556425	0.9852422	0.9863419
26	85 47 53.1	2 14.53	1 18.7	1 7 36.1	5.22	0.9556356	0.9874078	0.9884396
30	85 56 51.2	2 14.54	-1 18.4	-1 7 15.2	+5.22	0.9556288	0.9894366	0.9903983
May 4	86 5 49.4	2 14.54	1 18.1	1 6 54.3	5.23	0.9556222	0.9913242	0.9922140
8	86 14 47.5	2 14.54	1 17.8	1 6 33.4	5.23	0.9556157	0.9930071	0.9938829
12	86 23 45.7	2 14.54	1 17.5	1 6 12.5	5.24	0.9556094	0.9946608	0.9954003
16	86 32 43.9	2 14.55	1 17.2	1 5 51.5	5.24	0.9556032	0.9961010	0.9967625
20	86 41 42.1	2 14.55	-1 16.9	-1 5 30.5	+5.25	0.9555972	0.9973846	0.9979671
24	86 50 40.3	2 14.55	1 16.6	1 5 9.4	5.26	0.9555913	0.9985098	0.9990126
28	86 59 38.5	2 14.55	1 16.3	1 4 48.4	5.27	0.9555856	0.9994755	0.9998983
June 1	87 8 36.7	2 14.56	1 16.0	1 4 27.3	5.27	0.9555801	1.0002810	1.0006234
5	87 17 35.0	2 14.56	1 15.6	1 4 6.2	5.28	0.9555747	1.0009251	1.0011857
9	87 26 33.2	2 14.56	-1 15.3	-1 3 45.1	+5.29	0.9555694	1.0014052	1.0015834
13	87 35 31.5	2 14.56	1 15.0	1 3 23.9	5.29	0.9555643	1.0017203	1.0018158
17	87 44 29.7	2 14.57	1 14.7	1 3 2.7	5.30	0.9555594	1.0018699	1.0018825
21	87 53 28.0	2 14.57	1 14.4	1 2 41.5	5.31	0.9555546	1.0018539	1.0017842
25	88 2 26.3	2 14.57	1 14.1	1 2 20.2	5.31	0.9555500	1.0016736	1.0015221
29	88 11 24.6	2 14.57	-1 13.8	-1 1 59.0	+5.32	0.9555455	1.0013298	1.0010970
July 3	88 20 22.9	2 14.57	-1 13.4	-1 1 37.7	+5.33	0.9555412	1.0008235	

## SATURN.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
July 3	88° 20' 22.9"	2 14.57	-1 13.4	-1° 1' 37.7"	+5.33	0.9555412	1.0008235	1.0005094
7	88 29 21.2	2 14.57	1 13.0	1 1 16.3	5.33	0.9555370	1.0001547	0.9997592
11	88 38 19.5	2 14.58	1 12.7	1 0 55.0	5.34	0.9555330	0.9993234	0.9988473
15	88 47 17.8	2 14.58	1 12.3	1 0 33.6	5.35	0.9555291	0.9983314	0.9977758
19	88 56 16.1	2 14.58	1 11.9	1 0 12.2	5.35	0.9555254	0.9971809	0.9965472
23	89 5 14.4	2 14.58	-1 11.6	-0 59 50.8	+5.36	0.9555218	0.9958750	0.9951648
27	89 14 12.7	2 14.58	1 11.3	0 59 29.4	5.36	0.9555184	0.9944168	0.9936315
31	89 23 11.0	2 14.58	1 11.0	0 59 7.9	5.37	0.9555151	0.9928091	0.9919499
Aug. 4	89 32 9.4	2 14.58	1 10.6	0 58 46.4	5.37	0.9555120	0.9910543	0.9901226
8	89 41 7.7	2 14.58	1 10.3	0 58 24.9	5.38	0.9555091	0.9891554	0.9881530
12	89 50 6.0	2 14.58	-1 9.9	-0 58 3.4	+5.38	0.9555063	0.9871162	0.9860456
16	89 59 4.4	2 14.58	1 9.5	0 57 41.8	5.39	0.9555037	0.9849420	0.9838060
20	90 8 2.7	2 14.58	1 9.1	0 57 20.2	5.40	0.9555012	0.9826386	0.9814407
24	90 17 1.0	2 14.59	1 8.8	0 56 58.6	5.40	0.9554989	0.9802128	0.9789556
28	90 25 59.4	2 14.59	1 8.4	0 56 37.0	5.41	0.9554967	0.9776700	0.9763567
Sept. 1	90 34 57.7	2 14.59	-1 8.1	-0 56 15.3	+5.42	0.9554947	0.9750166	0.9736503
5	90 43 56.1	2 14.59	1 7.7	0 55 53.6	5.42	0.9554929	0.9722591	0.9708440
9	90 52 54.4	2 14.59	1 7.3	0 55 31.9	5.43	0.9554911	0.9694061	0.9679465
13	91 1 52.8	2 14.59	1 6.9	0 55 10.2	5.44	0.9554895	0.9664667	0.9649679
17	91 10 51.1	2 14.58	1 6.6	0 54 48.4	5.44	0.9554881	0.9634516	0.9619195
21	91 19 49.5	2 14.58	-1 6.2	-0 54 26.7	+5.45	0.9554869	0.9603727	0.9588126
25	91 28 47.8	2 14.58	1 5.8	0 54 4.9	5.45	0.9554858	0.9572404	0.9556573
29	91 37 46.1	2 14.58	1 5.4	0 53 43.0	5.46	0.9554849	0.9540651	0.9524654
Oct. 3	91 46 44.4	2 14.58	1 5.1	0 53 21.2	5.46	0.9554841	0.9508599	0.9492502
7	91 55 42.8	2 14.58	1 4.7	0 52 59.4	5.47	0.9554835	0.9476384	0.9460263
11	92 4 41.1	2 14.58	-1 4.3	-0 52 37.5	+5.47	0.9554830	0.9444161	0.9428098
15	92 13 39.4	2 14.58	1 3.9	0 52 15.6	5.48	0.9554827	0.9412095	0.9396172
19	92 22 37.7	2 14.58	1 3.5	0 51 53.7	5.48	0.9554825	0.9380350	0.9364649
23	92 31 36.0	2 14.58	1 3.1	0 51 31.7	5.49	0.9554825	0.9349090	0.9333691
27	92 40 34.3	2 14.58	1 2.7	0 51 9.7	5.49	0.9554827	0.9318475	0.9303463
31	92 49 32.6	2 14.57	-1 2.3	-0 50 47.8	+5.50	0.9554830	0.9288679	0.9274145
Nov. 4	92 58 30.9	2 14.57	1 1.9	0 50 25.8	5.50	0.9554835	0.9259885	0.9245924
8	93 7 29.2	2 14.57	1 1.6	0 50 3.7	5.51	0.9554841	0.9232294	0.9218990
12	93 16 27.5	2 14.57	1 1.2	0 49 41.7	5.52	0.9554848	0.9206066	0.9193536
16	93 25 25.8	2 14.57	1 0.8	0 49 19.6	5.52	0.9554857	0.9181420	0.9169738
20	93 34 24.1	2 14.57	-1 0.4	-0 48 57.5	+5.53	0.9554868	0.9158511	0.9147759
24	93 43 22.3	2 14.57	1 0.0	0 48 35.4	5.53	0.9554881	0.9137500	0.9127756
28	93 52 20.6	2 14.56	0 59.6	0 48 13.3	5.54	0.9554895	0.9118543	0.9109878
Dec. 2	94 1 18.9	2 14.56	0 59.2	0 47 51.1	5.54	0.9554910	0.9101783	0.9094280
6	94 10 17.1	2 14.56	0 58.8	0 47 28.9	5.54	0.9554927	0.9087380	0.9081100
10	94 19 15.4	2 14.56	-0 58.3	-0 47 6.8	+5.55	0.9554946	0.9075452	0.9070452
14	94 28 13.6	2 14.56	0 57.9	0 46 44.6	5.55	0.9554966	0.9066106	0.9062424
18	94 37 11.8	2 14.55	0 57.5	0 46 22.3	5.56	0.9554987	0.9059410	0.9057072
22	94 46 10.0	2 14.55	0 57.1	0 46 0.1	5.56	0.9555011	0.9055413	0.9054435
26	94 55 8.2	2 14.55	0 56.7	0 45 37.8	5.57	0.9555035	0.9054143	0.9054542
30	95 4 6.4	2 14.55	-0 56.3	-0 45 15.6	+5.57	0.9555062	0.9055627	0.9057398
34	95 13 4.5	2 14.54	-0 55.9	-0 44 53.3	+5.58	0.9555089	0.9059852	

URANUS.									
GREENWICH MEAN NOON.									
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radial Vector.	Logarithm of Distance from Earth—		
							At Date.	At Intermediate Date.	
Jan. 0	179 51' 42.7"	46.00	-5.1	+0 44' 28.8"	-0.18	1.2624877	1.2588578	1.2572287	
8	179 57' 55.5	46.00	5.1	0 44' 27.4	0.18	1.2624953	1.2556161	1.2540282	
16	180 4' 8.3	46.00	5.1	0 44' 26.0	0.18	1.2625030	1.2524741	1.2509622	
24	180 10' 21.0	46.00	5.2	0 44' 24.6	0.18	1.2625107	1.2495010	1.2480093	
Feb. 1	180 16' 33.8	46.00	5.2	0 44' 23.1	0.18	1.2625184	1.2467641	1.2455025	
9	180 22' 46.6	46.59	-5.2	+0 44' 21.7	-0.18	1.2625263	1.2443221	1.2432299	
17	180 28' 59.3	46.59	5.3	0 44' 20.2	0.18	1.2625342	1.2422331	1.2413375	
25	180 35' 12.1	46.59	5.3	0 44' 18.8	0.18	1.2625421	1.2405488	1.2398703	
Mar. 5	180 41' 24.8	46.59	5.3	0 44' 17.3	0.18	1.2625501	1.2393061	1.2388592	
13	180 47' 37.5	46.59	5.3	0 44' 15.8	0.19	1.2625582	1.2385327	1.2383288	
21	180 53' 50.3	46.59	-5.4	+0 44' 14.3	-0.19	1.2625663	1.2382485	1.2382915	
29	181 0' 3.0	46.59	5.4	0 44' 12.8	0.19	1.2625744	1.2384566	1.2387423	
Apr. 6	181 6' 15.7	46.58	5.4	0 44' 11.3	0.19	1.2625826	1.2391462	1.2396661	
14	181 12' 28.3	46.58	5.4	0 44' 9.8	0.19	1.2625909	1.2402988	1.2410401	
22	181 18' 41.0	46.58	5.5	0 44' 8.3	0.19	1.2625992	1.2418850	1.2428276	
30	181 24' 53.7	46.58	-5.5	+0 44' 6.7	-0.19	1.2626076	1.2439616	1.2449811	
May 8	181 31' 6.3	46.58	5.5	0 44' 5.2	0.19	1.2626160	1.2461802	1.2474523	
16	181 37' 19.0	46.58	5.6	0 44' 3.7	0.19	1.2626245	1.2487903	1.2501864	
24	181 43' 31.6	46.58	5.6	0 44' 2.1	0.20	1.2626330	1.2516326	1.2531215	
June 1	181 49' 44.2	46.58	5.6	0 44' 0.5	0.20	1.2626416	1.2546457	1.2561979	
9	181 55' 56.8	46.57	-5.6	+0 43' 59.0	-0.20	1.2626503	1.2577714	1.2593586	
17	182 2' 9.4	46.57	5.7	0 43' 57.4	0.20	1.2626590	1.2609514	1.2625428	
25	182 8' 22.0	46.57	5.7	0 43' 55.8	0.20	1.2626677	1.2641253	1.2656926	
July 3	182 14' 34.6	46.57	5.7	0 43' 54.2	0.20	1.2626765	1.2672387	1.2687577	
11	182 20' 47.2	46.57	5.7	0 43' 52.6	0.20	1.2626854	1.2702431	1.2716888	
19	182 26' 59.7	46.57	-5.8	+0 43' 51.0	-0.20	1.2626943	1.2730888	1.2744376	
27	182 33' 12.3	46.57	5.8	0 43' 49.3	0.20	1.2627032	1.2757309	1.2769645	
Aug. 4	182 39' 24.8	46.56	5.8	0 43' 47.7	0.20	1.2627122	1.2781334	1.2792337	
12	182 45' 37.3	46.56	5.8	0 43' 46.0	0.21	1.2627213	1.2802614	1.2812118	
20	182 51' 49.8	46.56	5.9	0 43' 44.4	0.21	1.2627304	1.2820818	1.2829687	
28	182 58' 2.3	46.56	-5.9	+0 43' 42.7	-0.21	1.2627396	1.2835704	1.2841843	
Sept. 5	183 4' 14.8	46.56	5.9	0 43' 41.1	0.21	1.2627488	1.2847078	1.2851386	
13	183 10' 27.2	46.56	6.0	0 43' 39.4	0.21	1.2627581	1.2854748	1.2857152	
21	183 16' 39.7	46.55	6.0	0 43' 37.7	0.21	1.2627674	1.2858588	1.2859054	
29	183 22' 52.1	46.55	6.0	0 43' 36.0	0.21	1.2627768	1.2858549	1.2857065	
Oct. 7	183 29' 4.5	46.55	-6.0	+0 43' 34.3	-0.21	1.2627862	1.2854601	1.2851157	
15	183 35' 16.9	46.55	6.1	0 43' 32.6	0.21	1.2627957	1.2846743	1.2841377	
23	183 41' 29.3	46.55	6.1	0 43' 30.9	0.22	1.2628052	1.2835078	1.2827862	
31	183 47' 41.7	46.55	6.1	0 43' 29.1	0.22	1.2628148	1.2819751	1.2810762	
Nov. 8	183 53' 54.1	46.54	6.1	0 43' 27.4	0.22	1.2628244	1.2800926	1.2790280	
16	184 0' 6.4	46.54	-6.2	+0 43' 25.6	-0.22	1.2628341	1.2778863	1.2766720	
24	184 6' 18.8	46.54	6.2	0 43' 23.9	0.22	1.2628438	1.2753898	1.2740440	
Dec. 2	184 12' 31.1	46.54	6.2	0 43' 22.1	0.22	1.2628536	1.2726398	1.2711822	
10	184 18' 43.4	46.54	6.2	0 43' 20.4	0.22	1.2628634	1.2696778	1.2681335	
18	184 24' 55.7	46.53	6.3	0 43' 18.6	0.22	1.2628733	1.2665565	1.2649535	
26	184 31' 8.0	46.53	-6.3	+0 43' 16.8	-0.22	1.2628832	1.2633316	1.2616982	
34	184 37' 20.2	46.53	-6.3	+0 43' 15.0	-0.22	1.2628932	1.2600606		



## NEPTUNE.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan. 0	52° 12' 46.5"	22.05	-19.8	-1° 44' 37.0"	+0.14	1.4744919	1.4649594	1.4657687
8	52 15 43.0	22.05	19.8	1 44 35.9	0.14	1.4744916	1.4666202	1.4675092
16	52 18 39.4	22.05	19.9	1 44 34.8	0.14	1.4744912	1.4684306	1.4693794
24	52 21 35.8	22.05	20.0	1 44 33.6	0.14	1.4744908	1.4703503	1.4713379
Feb. 1	52 24 32.2	22.05	20.1	1 44 32.5	0.14	1.4744905	1.4723377	1.4733448
9	52 27 28.6	22.05	-20.2	-1 44 31.4	+0.14	1.4744901	1.4743542	1.4753609
17	52 30 25.0	22.05	20.2	1 44 30.2	0.14	1.4744898	1.4763601	1.4773466
25	52 33 21.4	22.05	20.3	1 44 29.1	0.14	1.4744894	1.4783161	1.4792640
Mar. 5	52 36 17.8	22.05	20.4	1 44 28.0	0.14	1.4744891	1.4801865	1.4810795
13	52 39 14.2	22.05	20.5	1 44 26.8	0.14	1.4744887	1.4819395	1.4827624
21	52 42 10.6	22.05	-20.6	-1 44 25.7	+0.14	1.4744884	1.4835451	1.4842840
29	52 45 7.0	22.05	20.6	1 44 24.5	0.15	1.4744880	1.4849766	1.4856200
Apr. 6	52 48 3.4	22.05	20.7	1 44 23.3	0.15	1.4744877	1.4862125	1.4867519
14	52 50 59.8	22.05	20.8	1 44 22.2	0.15	1.4744873	1.4872360	1.4876619
22	52 53 56.1	22.05	20.8	1 44 21.0	0.15	1.4744870	1.4880291	1.4883367
30	52 56 52.5	22.05	-20.9	-1 44 19.8	+0.15	1.4744867	1.4885839	1.4887697
May 8	52 59 48.9	22.05	21.0	1 44 18.7	0.15	1.4744864	1.4888938	1.4889556
16	53 2 45.3	22.05	21.1	1 44 17.5	0.15	1.4744861	1.4889552	1.4888918
24	53 5 41.6	22.05	21.1	1 44 16.3	0.15	1.4744858	1.4887667	1.4885807
June 1	53 8 38.0	22.04	21.2	1 44 15.1	0.15	1.4744854	1.4883347	1.4880292
9	53 11 34.3	22.04	-21.3	-1 44 13.9	+0.15	1.4744851	1.4876657	1.4872450
17	53 14 30.7	22.04	21.4	1 44 12.7	0.15	1.4744848	1.4867692	1.4862397
25	53 17 27.0	22.04	21.4	1 44 11.5	0.15	1.4744845	1.4856591	1.4850298
July 3	53 20 23.4	22.04	21.5	1 44 10.3	0.15	1.4744842	1.4843540	1.4836338
11	53 23 19.7	22.04	21.6	1 44 9.1	0.15	1.4744839	1.4828721	1.4820716
19	53 26 16.0	22.04	-21.7	-1 44 7.8	+0.15	1.4744836	1.4812361	1.4803690
27	53 29 12.4	22.04	21.8	1 44 6.7	0.15	1.4744833	1.4794737	1.4785535
Aug. 4	53 32 8.7	22.04	21.8	1 44 5.4	0.15	1.4744831	1.4776123	1.4766535
12	53 35 5.0	22.04	21.9	1 44 4.2	0.15	1.4744828	1.4756819	1.4747018
20	53 38 1.3	22.04	22.0	1 44 2.9	0.15	1.4744825	1.4737177	1.4727338
28	53 40 57.6	22.04	-22.1	-1 44 1.7	+0.15	1.4744822	1.4717546	1.4707844
Sept. 5	53 43 53.9	22.04	22.1	1 44 0.5	0.15	1.4744820	1.4698279	1.4688897
13	53 46 50.3	22.04	22.2	1 43 59.2	0.16	1.4744818	1.4679746	1.4670877
21	53 49 46.6	22.04	22.3	1 43 58.0	0.16	1.4744815	1.4662333	1.4654158
29	53 52 42.9	22.04	22.4	1 43 56.7	0.16	1.4744813	1.4646393	1.4639080
Oct. 7	53 55 39.2	22.04	-22.4	-1 43 55.4	+0.16	1.4744810	1.4632260	1.4625975
15	53 58 35.4	22.04	22.5	1 43 54.2	0.16	1.4744808	1.4620261	1.4615162
23	54 1 31.7	22.04	22.6	1 43 52.9	0.16	1.4744806	1.4610696	1.4606888
31	54 4 28.0	22.04	22.7	1 43 51.6	0.16	1.4744804	1.4603762	1.4601346
Nov. 8	54 7 24.3	22.04	22.7	1 43 50.3	0.16	1.4744801	1.4599651	1.4598698
16	54 10 20.6	22.04	-22.8	-1 43 49.1	+0.16	1.4744799	1.4598484	1.4599017
24	54 13 16.9	22.04	22.9	1 43 47.8	0.16	1.4744797	1.4600290	1.4602302
Dec. 2	54 16 13.1	22.03	23.0	1 43 46.5	0.16	1.4744795	1.4605031	1.4608486
10	54 19 9.4	22.03	23.0	1 43 45.2	0.16	1.4744793	1.4612640	1.4617464
18	54 22 5.7	22.03	23.1	1 43 43.9	0.16	1.4744791	1.4622928	1.4629004
26	54 25 1.9	22.03	-23.2	-1 43 42.6	+0.16	1.4744789	1.4635654	1.4642845
34	54 27 58.2	22.03	-23.3	-1 43 41.2	+0.16	1.4744787	1.4650537	

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Jan. 0	+0.1758036	+0.1843986	- 154	-0.8874675	-0.8859969	+ 156	-0.3849928	-0.3843549	- 430
1	0.1929792	0.2015448	161	0.8844578	0.8828502	151	0.3836871	0.3829897	430
2	0.2100949	0.2186628	168	0.8811742	0.8794300	146	0.3822626	0.3815059	430
3	0.2271461	0.2356459	175	0.8776178	0.8757375	141	0.3807196	0.3799038	430
4	0.2441277	0.2525908	181	0.8737894	0.8717735	135	0.3790585	0.3781838	430
5	+0.2610346	+0.2694586	- 188	-0.8696899	-0.8675388	+ 129	-0.3772797	-0.3763463	- 430
6	0.2778620	0.2862441	194	0.8653203	0.8630345	123	0.3753836	0.3743917	430
7	0.2946043	0.3029419	200	0.8606816	0.8582617	117	0.3733707	0.3723206	430
8	0.3112563	0.3195468	206	0.8557750	0.8532217	110	0.3712416	0.3701338	429
9	0.3278129	0.3360539	212	0.8506018	0.8479157	103	0.3689968	0.3678311	429
10	+0.3442692	+0.3524581	- 218	-0.8451633	-0.8423450	+ 96	-0.3666369	-0.3654142	- 428
11	0.3606198	0.3687537	223	0.8394607	0.8365110	89	0.3641626	0.3628829	428
12	0.3768591	0.3849354	228	0.8334957	0.8304154	82	0.3615746	0.3602382	427
13	0.3929819	0.4009979	233	0.8272702	0.8240602	74	0.3588737	0.3574812	427
14	0.4089828	0.4169359	237	0.8207858	0.8174471	66	0.3560608	0.3546125	426
15	+0.4248565	+0.4327439	- 242	-0.8140445	-0.8105783	+ 58	-0.3531365	-0.3516329	- 425
16	0.4405976	0.4484168	246	0.8070487	0.8034562	50	0.3501018	0.3485435	424
17	0.4562008	0.4639491	250	0.7998009	0.7960834	41	0.3469580	0.3453456	424
18	0.4716610	0.4793359	254	0.7923039	0.7884627	32	0.3437063	0.3420403	423
19	0.4869732	0.4945724	258	0.7845602	0.7805966	23	0.3403477	0.3386285	422
20	+0.5021328	+0.5096539	- 261	-0.7765722	-0.7724874	+ 14	-0.3368831	-0.3351113	- 421
21	0.5171352	0.5245759	264	0.7683425	0.7641381	+ 5	0.3333137	0.3314901	420
22	0.5319755	0.5393334	267	0.7598745	0.7555523	- 5	0.3296409	0.3277662	418
23	0.5466490	0.5539218	269	0.7511717	0.7467332	14	0.3258662	0.3239411	417
24	0.5611513	0.5683371	271	0.7422371	0.7376837	24	0.3219909	0.3200159	415
25	+0.5754786	+0.5825755	- 273	-0.7330734	-0.7284066	- 34	-0.3180102	-0.3159919	- 414
26	0.5896271	0.5966330	275	0.7236836	0.7189050	44	0.3139433	0.3118704	412
27	0.6035926	0.6105053	276	0.7140710	0.7091822	54	0.3097736	0.3076529	411
28	0.6173708	0.6241884	277	0.7042390	0.6992417	65	0.3055086	0.3033407	409
29	0.6309579	0.6376787	278	0.6941908	0.6890866	75	0.3011495	0.2989351	408
30	+0.6443503	+0.6509723	- 279	-0.6839293	-0.6787196	- 86	-0.2966977	-0.2944375	- 406
31	0.6575443	0.6640658	279	0.6734575	0.6681437	96	0.2921547	0.2898494	404
Feb. 1	0.6705363	0.6769555	279	0.6627784	0.6573620	107	0.2875217	0.2851718	402
2	0.6833229	0.6896380	279	0.6518950	0.6463777	117	0.2827998	0.2804060	400
3	0.6959003	0.7021093	279	0.6408105	0.6351938	128	0.2779905	0.2755536	398
4	+0.7082645	+0.7143655	- 278	-0.6295282	-0.6238140	- 139	-0.2730955	-0.2706163	- 396
5	0.7204117	0.7264027	276	0.6180516	0.6122415	150	0.2681163	0.2655956	394
6	0.7323379	0.7382170	275	0.6063840	0.6004796	160	0.2630542	0.2604925	392
7	0.7440396	0.7498051	273	0.5945286	0.5885314	171	0.2579106	0.2553088	390
8	0.7555132	0.7611633	271	0.5824885	0.5764005	182	0.2526871	0.2500460	388
9	+0.7667550	+0.7722879	- 268	-0.5702678	-0.5640909	- 193	-0.2473854	-0.2447057	- 386
10	0.7777615	0.7831752	266	0.5578701	0.5516061	203	0.2420071	0.2392896	384
11	0.7885287	0.7938215	263	0.5452993	0.5389502	214	0.2365538	0.2337995	381
12	0.7990531	0.8042231	260	0.5325595	0.5261274	225	0.2310273	0.2282371	378
13	0.8093312	0.8143769	256	0.5196547	0.5131417	236	0.2254294	0.2226042	375
14	+0.8193598	+0.8242795	- 253	-0.5065891	-0.4999974	- 246	-0.2197619	-0.2169026	- 373
15	+0.8291356	+0.8339277	- 249	-0.4933673	-0.4866992	- 257	-0.2140267	-0.2111344	- 370

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Feb. 15	+0.8291356	+0.8339277	- 249	-0.4933673	-0.4866992	- 257	-0.2140267	-0.2111344	- 370
16	0.8386555	0.8433187	245	0.4799937	0.4732513	268	0.2082258	0.2053013	367
17	0.8479170	0.8524501	240	0.4664727	0.4596583	279	0.2023609	0.1994052	364
18	0.8569176	0.8613192	236	0.4528087	0.4459247	290	0.1964341	0.1934482	361
19	0.8656545	0.8699231	231	0.4390066	0.4320553	300	0.1904474	0.1874323	358
20	+0.8741250	+0.8782597	- 226	-0.4250711	-0.4180548	- 310	-0.1844028	-0.1813593	- 355
21	0.8823271	0.8863269	221	0.4110068	0.4039278	320	0.1783021	0.1752313	352
22	0.8902588	0.8941227	216	0.3968183	0.3896789	330	0.1721474	0.1690504	349
23	0.8979182	0.9016452	210	0.3825102	0.3753128	340	0.1659407	0.1628185	345
24	0.9053034	0.9088927	204	0.3680872	0.3608340	350	0.1596839	0.1565374	342
25	+0.9124128	+0.9158637	- 197	-0.3535537	-0.3462468	- 360	-0.1533790	-0.1502092	- 338
26	0.9192451	0.9225569	190	0.3389139	0.3315555	370	0.1470280	0.1438357	335
27	0.9257990	0.9289707	183	0.3241721	0.3167643	380	0.1406325	0.1374187	331
28	0.9320720	0.9351028	176	0.3093327	0.3018779	390	0.1341945	0.1309602	328
Mar. 1	-0.9380629	0.9409522	169	0.2944003	0.2869005	399	0.1277161	0.1244623	324
2	+0.9437706	+0.9465178	- 162	-0.2793791	-0.2718365	- 408	-0.1211990	-0.1179266	- 320
3	0.9491938	0.9517983	155	0.2642733	0.2566900	417	0.1146452	0.1113551	316
4	0.9543310	0.9567918	147	0.2490871	0.2414651	426	0.1080566	0.1047498	312
5	0.9591806	0.9614971	139	0.2338246	0.2261662	435	0.1014349	0.0981123	308
6	0.9637412	0.9659127	131	0.2184904	0.2107978	444	0.0947822	0.0914448	304
7	+0.9680114	+0.9700372	- 123	-0.2030890	-0.1953646	- 452	-0.0881004	-0.0847493	- 300
8	0.9719898	0.9738692	114	0.1876250	0.1798710	461	0.0813916	0.0780277	296
9	0.9756750	0.9774075	105	0.1721030	0.1643217	469	0.0746577	0.0712821	291
10	0.9790661	0.9806510	96	0.1565276	0.1487214	477	0.0679008	0.0645146	287
11	0.9821619	0.9835987	87	0.1409036	0.1330749	485	0.0611231	0.0577271	282
12	+0.9849612	+0.9862494	- 78	-0.1252357	-0.1173869	- 493	-0.0543265	-0.0509217	- 278
13	0.9874630	0.9886021	69	0.1095288	0.1016622	501	0.0475130	0.0441006	273
14	0.9896664	0.9906561	60	0.0937877	0.0859059	509	0.0406849	0.0372660	269
15	0.9915709	0.9924110	50	0.0780176	0.0701233	516	0.0338443	0.0304200	264
16	0.9931762	0.9938665	40	0.0622237	0.0543195	523	0.0269934	0.0235648	259
17	+0.9944820	+0.9950225	- 30	-0.0464112	-0.0384997	- 530	-0.0201344	-0.0167026	- 254
18	0.9954881	0.9958788	20	0.0305854	0.0226691	537	0.0132696	0.0098357	249
19	0.9961946	0.9964356	- 10	-0.0147513	-0.0068326	544	-0.0064013	-0.0029662	244
20	0.9966018	0.9966933	+ 1	+0.0010863	+0.0090049	551	+0.0004687	+0.0039038	239
21	0.9967102	0.9966525	11	0.0169226	0.0248387	557	0.0073383	0.0107722	234
22	+0.9965202	+0.9963135	+ 21	+0.0327525	+0.0406635	- 563	+0.0142052	+0.0176369	- 229
23	0.9960324	0.9956770	32	0.0485710	0.0564745	569	0.0210672	0.0244958	223
24	0.9952475	0.9947439	43	0.0643734	0.0722672	575	0.0279224	0.0313469	218
25	0.9941664	0.9935150	54	0.0801551	0.0880368	581	0.0347689	0.0381882	212
26	0.9927900	0.9919915	65	0.0959115	0.1037788	587	0.0416046	0.0450178	207
27	+0.9911196	+0.9901745	+ 76	+0.1116382	+0.1194889	- 592	+0.0484276	+0.0518337	- 201
28	0.9891562	0.9880648	87	0.1273307	0.1351827	598	0.0552358	0.0586338	196
29	0.9869004	0.9856632	99	0.1429847	0.1507960	603	0.0620273	0.0654163	189
30	0.9843533	0.9829709	110	0.1585961	0.1663846	608	0.0688004	0.0721794	183
31	0.9815161	0.9799891	122	0.1741608	0.1819243	613	0.0755532	0.0789214	177
32	+0.9783900	+0.9767188	+ 133	+0.1896746	+0.1974110	- 618	+0.0822839	+0.0856404	- 171
33	+0.9749757	+0.9731608	+ 145	+0.2051330	+0.2128401	- 622	+0.0889906	+0.0923343	- 165

FOR GREENWICH MEAN NOON AND MIDNIGHT.									
Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Apr. 1	+0.9783900	+0.9767188	+ 133	+0.1896746	+0.1974110	- 618	+0.0892839	+0.0856404	- 171
2	0.9749757	0.9731608	145	0.2051330	0.2128401	622	0.0889906	0.0923343	165
3	0.9712743	0.9693163	157	0.2205318	0.2282076	626	0.0956713	0.0990014	159
4	0.9672869	0.9651862	169	0.2358669	0.2435092	630	0.1023242	0.1056396	153
5	0.9630144	0.9607717	181	0.2511338	0.2587403	634	0.1089473	0.1122471	147
6	+0.9584583	+0.9560742	+ 194	+0.2663280	+0.2738965	- 637	+0.1155388	+0.1188220	- 141
7	0.9536197	0.9510949	206	0.2814452	0.2889736	641	0.1220967	0.1253624	135
8	0.9485000	0.9458351	219	0.2964810	0.3039671	644	0.1286192	0.1318665	128
9	0.9431003	0.9402959	231	0.3114310	0.3188724	647	0.1351043	0.1383323	122
10	0.9374221	0.9344792	244	0.3262907	0.3336853	650	0.1415501	0.1447577	115
11	+0.9314673	+0.9283868	+ 256	+0.3410555	+0.3484007	- 653	+0.1479546	+0.1511407	- 109
12	0.9252378	0.9220207	269	0.3557204	0.3630142	656	0.1543157	0.1574794	102
13	0.9187356	0.9153828	282	0.3702814	0.3775214	659	0.1606317	0.1637721	95
14	0.9119626	0.9084753	295	0.3847338	0.3919178	661	0.1669006	0.1700167	88
15	0.9049213	0.9013008	308	0.3990730	0.4061988	663	0.1731203	0.1762111	82
16	+0.8976141	+0.8938616	+ 321	+0.4132945	+0.4203598	- 665	+0.1792890	+0.1823536	- 75
17	0.8900436	0.8861604	334	0.4273939	0.4343965	667	0.1854049	0.1884426	68
18	0.8822124	0.8782000	347	0.4413671	0.4483051	669	0.1914664	0.1944762	61
19	0.8741236	0.8699834	360	0.4552102	0.4620817	670	0.1974716	0.2004526	54
20	0.8657799	0.8615134	374	0.4689193	0.4757223	671	0.2034187	0.2063700	47
21	+0.8571843	+0.8527930	+ 387	+0.4824904	+0.4892229	- 672	+0.2093060	+0.2122268	- 40
22	0.8483400	0.8438256	401	0.4959195	0.5025797	673	0.2151319	0.2180214	33
23	0.8392501	0.8346139	414	0.5092031	0.5157893	673	0.2208949	0.2237524	26
24	0.8299175	0.8251612	428	0.5223380	0.5288483	673	0.2265935	0.2294181	18
25	0.8203455	0.8154707	442	0.5353207	0.5417535	673	0.2322260	0.2350171	11
26	+0.8105372	+0.8055453	+ 456	+0.5481477	+0.5545016	- 673	+0.2377911	+0.2405479	- 3
27	0.8004955	0.7953882	469	0.5608157	0.5670892	672	0.2432873	0.2460092	+ 4
28	0.7902237	0.7850023	483	0.5733218	0.5795131	671	0.2487132	0.2513994	12
29	0.7797245	0.7743908	497	0.5856627	0.5917703	670	0.2540674	0.2567171	19
30	0.7690014	0.7635567	511	0.5978354	0.6038574	669	0.2593484	0.2619610	27
May 1	+0.7580572	+0.7525031	+ 525	+0.6098362	+0.6157712	- 668	+0.2645548	+0.2671296	+ 34
2	0.7468948	0.7412326	539	0.6216622	0.6275089	666	0.2696853	0.2722217	42
3	0.7355170	0.7297483	553	0.6333108	0.6390676	664	0.2747386	0.2772359	50
4	0.7239270	0.7180535	567	0.6447788	0.6504439	662	0.2797133	0.2821707	58
5	0.7121282	0.7061515	581	0.6560625	0.6616342	659	0.2846079	0.2870247	66
6	+0.7001238	+0.6940456	+ 595	+0.6671585	+0.6726350	- 656	+0.2894210	+0.2917966	+ 74
7	0.6879171	0.6817388	609	0.6780634	0.6834433	653	0.2941513	0.2964849	82
8	0.6755111	0.6692344	623	0.6887743	0.6940561	650	0.2987972	0.3010881	90
9	0.6629093	0.6565363	637	0.6992982	0.7044702	646	0.3033574	0.3056050	98
10	0.6501157	0.6436481	651	0.7096017	0.7146823	642	0.3078306	0.3100342	106
11	+0.6371339	+0.6305737	+ 665	+0.7197115	+0.7246880	- 638	+0.3122155	+0.3143744	+ 114
12	0.6239680	0.6173172	680	0.7296143	0.7344872	634	0.3165107	0.3186243	122
13	0.6106219	0.6038826	694	0.7393072	0.7440741	630	0.3207150	0.3227827	131
14	0.5970998	0.5902741	708	0.7487874	0.7534469	625	0.3248271	0.3268483	138
15	0.5834059	0.5764958	722	0.7580522	0.7626029	620	0.3288458	0.3308198	146
16	+0.5695444	+0.5625523	+ 737	+0.7670987	+0.7715393	- 614	+0.3327699	+0.3346962	+ 154
17	+0.5555200	+0.5484482	+ 751	+0.7759243	+0.7802535	- 608	+0.3365984	+0.3384765	+ 162

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
May 17	+0.5555200	+0.5484482	+ 751	+0.7750243	+0.7802535	- 608	+0.3365984	+0.3384765	+ 162
18	0.5413373	0.5341879	765	0.7845267	0.7887435	602	0.3403303	0.3421597	170
19	0.5270006	0.5197759	779	0.7929037	0.7970070	596	0.3439645	0.3457448	178
20	0.5125144	0.5052167	793	0.8010533	0.8050421	589	0.3475002	0.3492309	187
21	0.4978832	0.4905146	807	0.8089734	0.8128467	582	0.3509365	0.3526170	196
22	+0.4831114	+0.4756743	+ 821	+0.8166619	+0.8204188	- 574	+0.3542724	+0.3559724	+ 204
23	0.4682037	0.4607002	835	0.8241172	0.8277570	566	0.3575072	0.3590864	212
24	0.4531643	0.4455564	848	0.8313380	0.8348599	558	0.3606402	0.3621683	220
25	0.4379973	0.4303673	862	0.8383227	0.8417260	550	0.3636708	0.3651475	229
26	0.4227071	0.4150173	875	0.8450697	0.8483536	541	0.3665983	0.3680231	237
27	+0.4072983	+0.3995507	+ 889	+0.8515774	+0.8547410	- 532	+0.3694218	+0.3707944	+ 245
28	0.3917750	0.3839718	902	0.8578441	0.8608867	522	0.3721406	0.3734607	253
29	0.3761415	0.3682845	916	0.8638684	0.8667893	512	0.3747542	0.3760214	262
30	0.3604014	0.3524928	929	0.8696491	0.8724477	502	0.3772620	0.3784760	270
31	0.3445501	0.3366009	942	0.8751848	0.8778604	492	0.3796634	0.3808230	278
June 1	+0.3296189	+0.3206133	+ 955	+0.8804740	+0.8830257	- 481	+0.3819577	+0.3830644	+ 286
2	0.3125849	0.3045340	967	0.8855151	0.8879420	470	0.3841441	0.3851967	295
3	0.2964613	0.2883672	980	0.8903064	0.8926079	458	0.3862221	0.3872202	303
4	0.2802524	0.2721174	993	0.8948465	0.8970220	446	0.3881910	0.3891344	311
5	0.2639628	0.2557892	1005	0.8991341	0.9011827	433	0.3900503	0.3909387	319
6	+0.2475972	+0.2393872	+1017	+0.9031677	+0.9050887	- 420	+0.3917994	+0.3926324	+ 328
7	0.2311599	0.2229159	1029	0.9069457	0.9087385	407	0.3934376	0.3942149	336
8	0.2146556	0.2063798	1041	0.9104669	0.9121309	394	0.3949644	0.3956859	345
9	0.1980690	0.1897839	1052	0.9137302	0.9152647	380	0.3963794	0.3970448	353
10	0.1814651	0.1731334	1063	0.9167344	0.9181388	366	0.3976821	0.3982912	361
11	+0.1647892	+0.1564332	+1074	+0.9194781	+0.9207520	- 352	+0.3988720	+0.3994245	+ 369
12	0.1480660	0.1396883	1085	0.9219605	0.9231036	338	0.3999487	0.4004445	377
13	0.1313007	0.1229038	1095	0.9241811	0.9251931	323	0.4009119	0.4013509	385
14	0.1144983	0.1060849	1105	0.9261394	0.9270200	308	0.4017614	0.4021435	393
15	0.0976641	0.0892365	1115	0.9278349	0.9285840	292	0.4024970	0.4028221	401
16	+0.0808029	+0.0723637	+1125	+0.9292673	+0.9298848	- 276	+0.4031187	+0.4033868	+ 409
17	0.0639197	0.0554716	1134	0.9304364	0.9309222	260	0.4036264	0.4038375	417
18	0.0470199	0.0385653	1143	0.9313422	0.9316963	243	0.4040200	0.4041740	425
19	0.0301083	0.0216497	1152	0.9319847	0.9322072	225	0.4042094	0.4043963	433
20	+0.0131900	+0.0047298	+1160	+0.9323640	+0.9324551	- 208	+0.4044647	+0.4045045	+ 441
21	-0.0037302	-0.0121896	+1168	+0.9324806	+0.9324405	- 190	+0.4045159	+0.4044988	+ 449
22	0.0206478	0.0201043	1176	0.9323349	0.9321639	172	0.4044533	0.4043794	457
23	0.0375584	0.0460096	1183	0.9319275	0.9316258	154	0.4042771	0.4041465	465
24	0.0544573	0.0629010	1190	0.9312587	0.9308265	135	0.4039875	0.4038002	473
25	0.0713401	0.0797740	1197	0.9303290	0.9297664	116	0.4035845	0.4033405	480
26	-0.0882023	-0.0966243	+1204	+0.9291387	+0.9284460	- 97	+0.4030682	+0.4027677	+ 488
27	0.1050394	0.1134472	1210	0.9276883	0.9268657	77	0.4024390	0.4020821	495
28	0.1218470	0.1302383	1216	0.9259782	0.9250259	57	0.4016970	0.4012838	503
29	0.1386205	0.1469932	1221	0.9240088	0.9229270	37	0.4008424	0.4003730	510
30	0.1553558	0.1637078	1226	0.9217805	0.9205694	- 17	0.3998754	0.3993499	518
31	-0.1720486	-0.1803777	+1230	+0.9192938	+0.9179537	+ 3	+0.3987962	+0.3982146	+ 525
32	-0.1886945	-0.1969985	+1234	+0.9165491	+0.9150802	+ 24	+0.3976050	+0.3969674	+ 532

FOR GREENWICH MEAN NOON AND MIDNIGHT.									
Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
July 1	-0.1720486	-0.1803777	+1230	+0.9192938	+0.9179537	+ 3	+0.3987962	+0.3982146	+ 525
2	0.1886945	0.1969985	1234	0.9165491	0.9150802	24	0.3976050	0.3969674	532
3	0.2052891	0.2135656	1238	0.9135469	0.9119493	45	0.3963019	0.3956086	539
4	0.2218274	0.2300740	1241	0.9102876	0.9085617	66	0.3948873	0.3941383	546
5	0.2383048	0.2465192	1244	0.9067718	0.9049180	88	0.3933615	0.3925570	552
6	-0.2547166	-0.2628965	+1246	+0.9030002	+0.9010188	+ 110	+0.3917249	+0.3908650	+ 559
7	0.2710580	0.2792007	1248	0.8989735	0.8968648	132	0.3899777	0.3890627	565
8	0.2873238	0.2954269	1250	0.8946925	0.8924569	154	0.3881202	0.3871503	572
9	0.3035094	0.3115707	1251	0.8901580	0.8877961	176	0.3861529	0.3851283	578
10	0.3196103	0.3276274	1251	0.8853713	0.8828838	198	0.3840763	0.3829973	585
11	-0.3356215	-0.3435919	+1251	+0.8803339	+0.8777215	+ 221	+0.3818910	+0.3807579	+ 591
12	0.3515380	0.3594591	1250	0.8750470	0.8723104	244	0.3795977	0.3784108	598
13	0.3673545	0.3752238	1249	0.8695120	0.8666521	267	0.3771971	0.3759567	604
14	0.3830663	0.3908815	1248	0.8637308	0.8607484	290	0.3746898	0.3733963	610
15	0.3986689	0.4064279	1246	0.8577051	0.8546012	313	0.3720764	0.3707302	615
16	-0.4141579	-0.4218583	+1244	+0.8514370	+0.8482127	+ 336	+0.3693579	+0.3679595	+ 621
17	0.4295287	0.4371683	1241	0.8449284	0.8415846	359	0.3665352	0.3650850	627
18	0.4447767	0.4523533	1238	0.8381814	0.8347193	382	0.3636091	0.3621075	633
19	0.4598975	0.4674090	1234	0.8311984	0.8276191	406	0.3605805	0.3590281	639
20	0.4748870	0.4823313	1229	0.8239816	0.8202862	429	0.3574505	0.3558477	645
21	-0.4897413	-0.4971165	+1224	+0.8165332	+0.8127229	+ 453	+0.3542199	+0.3525672	+ 650
22	0.5044565	0.5117608	1219	0.8088554	0.8049313	476	0.3508897	0.3491875	656
23	0.5190288	0.5262800	1213	0.8009506	0.7969140	500	0.3474608	0.3457097	661
24	0.5334540	0.5406103	1206	0.7928213	0.7886732	523	0.3439343	0.3421348	666
25	0.5477234	0.5548079	1199	0.7844696	0.7802111	547	0.3403113	0.3384639	671
26	-0.5618485	-0.5688496	+1192	+0.7758978	+0.7715301	+ 570	+0.3365927	+0.3346978	+ 676
27	0.5758108	0.5827316	1184	0.7671081	0.7626323	594	0.3327793	0.3308374	681
28	0.5896114	0.5964499	1175	0.7581027	0.7535199	617	0.3288722	0.3268838	686
29	0.6032465	0.6100008	1166	0.7488839	0.7441951	641	0.3248724	0.3228380	690
30	0.6167122	0.6233803	1157	0.7394538	0.7346602	664	0.3207809	0.3187011	694
31	-0.6300046	-0.6365847	+1147	+0.7298146	+0.7249173	+ 687	+0.3165988	+0.3144740	+ 698
Aug. 1	0.6431201	0.6496105	1137	0.7199686	0.7149689	710	0.3123270	0.3101578	702
2	0.6560554	0.6624541	1126	0.7099183	0.7048173	734	0.3079666	0.3057535	706
3	0.6688063	0.6751113	1115	0.6996661	0.6944650	757	0.3035186	0.3012621	710
4	0.6813687	0.6875780	1103	0.6892145	0.6839147	780	0.2989842	0.2966850	713
5	-0.6937386	-0.6998501	+1090	+0.6785661	+0.6731691	+ 803	+0.2943647	+0.2920234	+ 717
6	0.7059120	0.7119239	1077	0.6677239	0.6622310	825	0.2896612	0.2872783	720
7	0.7178853	0.7237957	1063	0.6566906	0.6511031	848	0.2848749	0.2824511	723
8	0.7296546	0.7354617	1049	0.6454689	0.6397885	870	0.2800071	0.2775431	726
9	0.7412163	0.7469181	1034	0.6340621	0.6282905	892	0.2750592	0.2725557	729
10	-0.7525665	-0.7581611	+1019	+0.6224738	+0.6166127	+ 914	+0.2700327	+0.2674904	+ 731
11	0.7637014	0.7691870	1004	0.6107076	0.6047588	936	0.2649290	0.2623487	734
12	0.7746174	0.7799923	988	0.5987669	0.5927322	958	0.2597407	0.2571322	736
13	0.7853112	0.7905738	971	0.5866552	0.5806364	980	0.2544963	0.2518423	738
14	0.7957796	0.8009283	954	0.5743761	0.5681750	1001	0.2491703	0.2464806	740
15	-0.8060195	-0.8110528	+ 937	+0.5619334	+0.5556519	+1022	+0.2437733	+0.2410487	+ 742
16	-0.8160270	-0.8209445	+ 919	+0.5493309	+0.5429709	+1043	+0.2383069	+0.2355482	+ 744

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.			Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.	Noon.		Noon.	Midnight.	
Aug. 16	-0.8160279	-0.8209445	+ 919	+0.5193309	+0.5429709	+1043	+0.2383069	+0.2355482	+ 744	
17	0.8258023	0.8306008	901	0.5365723	0.5301358	1064	0.2327727	0.2299806	746	
18	0.8353397	0.8400187	882	0.5236617	0.5171505	1084	0.2271723	0.2243478	747	
19	0.8446375	0.8491958	863	0.5106027	0.5040188	1104	0.2215074	0.2186514	749	
20	0.8536934	0.8581298	844	0.4973993	0.4907446	1123	0.2157798	0.2128930	750	
21	-0.8625050	-0.8668181	+ 824	+0.4840552	+0.4773315	+1142	+0.2099910	+0.2070742	+ 751	
22	0.8710700	0.8752593	803	0.4705740	0.4637831	1161	0.2041426	0.2011966	751	
23	0.8793861	0.8834501	782	0.4569594	0.4501033	1180	0.1982361	0.1952617	751	
24	0.8874510	0.8913886	761	0.4432152	0.4362957	1198	0.1922733	0.1892713	752	
25	0.8952625	0.8990726	739	0.4293451	0.4223640	1216	0.1862558	0.1832270	752	
26	-0.9028186	-0.9065002	+ 717	+0.4153527	+0.4083117	+1233	+0.1801852	+0.1771304	+ 752	
27	0.9101171	0.9136691	695	0.4012413	0.3941420	1250	0.1740628	0.1709827	752	
28	0.9171558	0.9205770	672	0.3870142	0.3798585	1267	0.1678902	0.1647856	751	
29	0.9239323	0.9272215	649	0.3726753	0.3654652	1284	0.1616691	0.1585410	750	
30	0.9304443	0.9336004	626	0.3582286	0.3509661	1300	0.1554014	0.1522506	749	
31	-0.9366895	-0.9397114	+ 602	+0.3436781	+0.3363651	+1316	+0.1490888	+0.1459162	+ 748	
Sept. 1	0.9426657	0.9455522	578	0.3290276	0.3216661	1332	0.1427330	0.1395394	747	
2	0.9483707	0.9511209	554	0.3142810	0.3068727	1347	0.1363356	0.1331219	746	
3	0.9538024	0.9564151	529	0.2994418	0.2919889	1362	0.1298983	0.1266653	744	
4	0.9589586	0.9614327	504	0.2845145	0.2770192	1377	0.1234228	0.1201714	743	
5	-0.9638372	-0.9661717	+ 479	+0.2695035	+0.2619681	+1391	+0.1169111	+0.1136423	+ 741	
6	0.9684361	0.9706302	453	0.2544133	0.2468399	1404	0.1103653	0.1070801	739	
7	0.9727537	0.9748065	427	0.2392483	0.2316391	1417	0.1037872	0.1004865	737	
8	0.9767883	0.9786989	401	0.2240129	0.2163701	1429	0.0971785	0.0938634	735	
9	0.9805382	0.9823059	374	0.2087116	0.2010378	1441	0.0905414	0.0872128	732	
10	-0.9840019	-0.9856260	+ 347	+0.1933494	+0.1856471	+1453	+0.0838779	+0.0805369	+ 729	
11	0.9871780	0.9886579	320	0.1779314	0.1702029	1464	0.0771901	0.0738377	726	
12	0.9900656	0.9914010	293	0.1624623	0.1547100	1475	0.0704800	0.0671172	723	
13	0.9926640	0.9938545	266	0.1469467	0.1391729	1485	0.0637496	0.0603774	720	
14	0.9949724	0.9960176	239	0.1313892	0.1235963	1495	0.0570010	0.0536205	717	
15	-0.9969900	-0.9978895	+ 211	+0.1157946	+0.1079848	+1504	+0.0502362	+0.0468484	+ 713	
16	0.9987161	0.9994697	183	0.1001674	0.0923431	1513	0.0434572	0.0400630	709	
17	1.0001503	1.0007580	155	0.0845124	0.0766760	1522	0.0366660	0.0332664	705	
18	1.0012926	1.0017543	127	0.0688345	0.0609884	1530	0.0298845	0.0264606	701	
19	1.0021420	1.0024586	98	0.0531383	0.0452846	1538	0.0230548	0.0196476	696	
20	-1.0027011	-1.0028706	+ 69	+0.0374279	+0.0295687	+1545	+0.0162390	+0.0128293	+ 692	
21	1.0029668	1.0029899	40	0.0217076	+0.0138451	1552	0.0094187	+0.0060075	687	
22	1.0029398	1.0028166	+ 11	+0.0059817	-0.0018820	1558	+0.0029599	-0.0008158	682	
23	1.0026202	1.0023506	- 18	-0.0097454	0.0176081	1564	-0.0042274	0.0076387	676	
24	1.0020079	1.0015920	47	0.0254695	0.0333291	1570	0.0110494	0.0144593	671	
25	-1.0011030	-1.0005408	- 77	-0.0411863	-0.0490407	+1575	-0.0178681	-0.0212757	+ 665	
26	0.9999054	0.9991967	106	0.0568916	0.0647385	1579	0.0246817	0.0280861	659	
27	0.9984148	0.9975595	136	0.0725810	0.0804182	1583	0.0314884	0.0348886	653	
28	0.9966311	0.9956294	165	0.0882500	0.0960755	1587	0.0382862	0.0416812	647	
29	0.9945545	0.9934064	195	0.1038943	0.1117058	1590	0.0450731	0.0484619	640	
30	-0.9921850	-0.9908905	- 225	-0.1195094	-0.1273046	+1593	-0.0518471	-0.0552287	+ 633	
31	-0.9895228	-0.9880620	- 255	-0.1350908	-0.1428674	+1595	-0.0586063	-0.0619797	+ 626	

FOR GREENWICH MEAN NOON AND MIDNIGHT.										
Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.		
Oct.	1	-0.9895228	-0.9880820	-255	-0.1350908	-0.1428674	+1595	-0.0586063	-0.0619797	+ 626
	2	0.9865680	0.9849809	285	0.1506339	0.1583896	1597	0.0653487	0.0687129	619
	3	0.9833206	0.9815872	315	0.1661338	0.1738661	1598	0.0720723	0.0754264	611
	4	0.9797809	0.9779017	345	0.1815858	0.1892923	1599	0.0787750	0.0821179	604
	5	0.9759497	0.9739250	375	0.1969850	0.2046634	1599	0.0854548	0.0887854	596
	6	-0.9718277	-0.9696578	-405	-0.2123267	-0.2199744	+1599	-0.0921095	-0.0954268	+ 589
	7	0.9674156	0.9651011	435	0.2276058	0.2352203	1598	0.0987370	0.1020399	581
	8	0.9627144	0.9602558	466	0.2428173	0.2503962	1597	0.1053352	0.1086226	574
	9	0.9577254	0.9551233	496	0.2579563	0.2654971	1595	0.1119020	0.1151729	565
	10	0.9524498	0.9497050	526	0.2730179	0.2805181	1593	0.1184353	0.1216887	556
	11	-0.9468892	-0.9440026	-556	-0.2879971	-0.2954543	+1591	-0.1249330	-0.1281678	+ 547
	12	0.9410453	0.9380178	586	0.3028891	0.3103010	1588	0.1313930	0.1346082	538
	13	0.9349201	0.9317526	616	0.3176895	0.3250539	1584	0.1378134	0.1410081	528
	14	0.9285155	0.9252090	646	0.3323937	0.3397083	1580	0.1441922	0.1473654	518
	15	0.9218334	0.9183889	676	0.3469970	0.3542595	1576	0.1505274	0.1536781	508
	16	-0.9148758	-0.9112944	-706	-0.3614949	-0.3687031	+1571	-0.1568171	-0.1599443	+ 498
	17	0.9076449	0.9039277	736	0.3758831	0.3830348	1566	0.1630593	0.1661621	487
	18	0.9001430	0.8962911	766	0.3901575	0.3972507	1560	0.1692522	0.1723297	477
	19	0.8923724	0.8883870	796	0.4043141	0.4113469	1554	0.1753941	0.1784454	467
	20	0.8843354	0.8802179	826	0.4183489	0.4253193	1547	0.1814832	0.1845074	457
	21	-0.8760347	-0.8717862	-856	-0.4322577	-0.4391636	+1540	-0.1875177	-0.1905139	+ 446
	22	0.8674725	0.8630940	886	0.4460364	0.4528758	1532	0.1934957	0.1964630	435
	23	0.8586508	0.8541434	915	0.4590812	0.4664523	1524	0.1994155	0.2023531	424
	24	0.8495718	0.8449365	945	0.4731885	0.4798893	1515	0.2052755	0.2081826	413
	25	0.8402378	0.8354760	974	0.4865543	0.4931830	1506	0.2110740	0.2139497	401
	26	-0.8306513	-0.8257641	-1003	-0.4997748	-0.5063293	+1496	-0.2168094	-0.2196528	+ 390
	27	0.8208145	0.8158030	1032	0.5128458	0.5193239	1486	0.2224798	0.2252900	378
	28	0.8107300	0.8055957	1061	0.5257631	0.5321629	1476	0.2280833	0.2308594	366
	29	0.8004003	0.7951443	1090	0.5385227	0.5448422	1465	0.2336182	0.2363594	354
	30	0.7898281	0.7844520	1119	0.5511208	0.5573581	1454	0.2390829	0.2417885	342
	31	-0.7790161	-0.7735211	-1147	-0.5635535	-0.5697066	+1442	-0.2444759	-0.2471449	+ 330
Nov.	1	0.7679669	0.7623542	1175	0.5758167	0.5818835	1429	0.2497953	0.2524267	318
	2	0.7566833	0.7509544	1203	0.5879062	0.5938845	1416	0.2550391	0.2576321	305
	3	0.7451682	0.7393248	1231	0.5998177	0.6057054	1403	0.2602055	0.2627593	293
	4	0.7334248	0.7274685	1259	0.6115471	0.6173423	1389	0.2652931	0.2678068	280
	5	-0.7214565	-0.7153894	-1287	-0.6230905	-0.6287912	+1374	-0.2703001	-0.2727728	+ 267
	6	0.7092674	0.7030914	1314	0.6344440	0.6400482	1359	0.2752247	0.2776555	254
	7	0.6968614	0.6905782	1341	0.6456034	0.6511091	1344	0.2800651	0.2824533	241
	8	0.6842421	0.6778536	1368	0.6565649	0.6619702	1328	0.2848198	0.2871646	227
	9	0.6714132	0.6649215	1395	0.6673247	0.6726279	1311	0.2894874	0.2917879	213
	10	-0.6583789	-0.6517861	-1421	-0.6778794	-0.6830788	+1294	-0.2940661	-0.2963217	+ 199
	11	0.6451435	0.6384518	1448	0.6882257	0.6933197	1277	0.2985545	0.3007644	185
	12	0.6317114	0.6249229	1474	0.6983602	0.7033471	1259	0.3029511	0.3051146	171
	13	0.6180869	0.6112037	1500	0.7082797	0.7131580	1240	0.3072546	0.3093711	157
	14	0.6042741	0.5972984	1525	0.7179814	0.7227497	1221	0.3114637	0.3135326	142
	15	-0.5902773	-0.5832114	-1551	-0.7274625	-0.7321194	+1202	-0.3155772	-0.3175978	+ 128
	16	-0.5761011	-0.5689472	-1576	-0.7367201	-0.7412643	+1182	-0.3195930	-0.3216555	+ 113



## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date:	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Noon.		Midnight.	Noon.	
Nov. 16	-0.5761011	-0.5689472	-1576	-0.7367201	-0.7412643	+1182	-0.3195939	-0.3215655	+ 113
17	0.5617500	0.5545103	1600	0.7457515	0.7501815	1161	0.3235124	0.3254345	99
18	0.5472285	0.5399051	1623	0.7545539	0.7588684	1140	0.3273316	0.3292036	84
19	0.5325407	0.5251357	1646	0.7631248	0.7673227	1119	0.3310503	0.3328717	69
20	0.5176908	0.5102064	1669	0.7714620	0.7755423	1097	0.3346675	0.3364378	54
21	-0.5026832	-0.4951215	-1694	-0.7795633	-0.7835247	+1075	-0.3381822	-0.3399008	+ 40
22	0.4875919	0.4798850	1718	0.7874263	0.7912676	1053	0.3415934	0.3432598	25
23	0.4722112	0.4645013	1741	0.7950485	0.7987686	1030	0.3448999	0.3465137	+ 10
24	0.4567556	0.4489748	1764	0.8024276	0.8060252	1007	0.3481009	0.3496615	- 5
25	0.4411593	0.4333097	1786	0.8095610	0.8130348	983	0.3511952	0.3527020	20
26	-0.4254265	-0.4175103	-1808	-0.8164462	-0.8197949	+ 958	-0.3541816	-0.3556341	- 35
27	0.4095617	0.4015813	1829	0.8230808	0.8263034	932	0.3570592	0.3584570	50
28	0.3935696	0.3855272	1850	0.8294626	0.8325581	906	0.3598271	0.3611697	66
29	0.3774547	0.3693527	1870	0.8355896	0.8385568	880	0.3624844	0.3637713	81
30	0.3612218	0.3530626	1890	0.8414595	0.8442072	853	0.3650301	0.3662608	97
Dec. 1	-0.3448758	-0.3366618	-1909	-0.8470698	-0.8497768	+ 826	-0.3674631	-0.3686371	- 112
2	0.3284214	0.3201552	1928	0.8524181	0.8549932	798	0.3697824	0.3708092	128
3	0.3118637	0.3035479	1947	0.8575021	0.8599444	770	0.3719872	0.3730464	143
4	0.2952081	0.2868454	1965	0.8623199	0.8646285	742	0.3740767	0.3750780	159
5	0.2784602	0.2700532	1982	0.8668699	0.8690440	713	0.3760502	0.3769932	174
6	-0.2616251	-0.2531765	-1999	-0.8711505	-0.8731892	+ 684	-0.3779069	-0.3787912	- 190
7	0.2447082	0.2362209	2016	0.8751599	0.8770624	654	0.3796461	0.3804714	205
8	0.2277154	0.2191923	2032	0.8789965	0.8806619	623	0.3812671	0.3820331	221
9	0.2106523	0.2020962	2047	0.8823590	0.8839871	592	0.3827694	0.3834759	236
10	0.1935245	0.1849381	2062	0.8855464	0.8870367	561	0.3841525	0.3847992	252
11	-0.1763375	-0.1677235	-2076	-0.8884579	-0.8898099	+ 529	-0.3854160	-0.3860028	- 267
12	0.1590968	0.1504581	2090	0.8910927	0.8923062	497	0.3865596	0.3870864	283
13	0.1418081	0.1331476	2103	0.8934503	0.8945250	464	0.3875531	0.3880496	299
14	0.1244770	0.1157973	2116	0.8955301	0.8964656	431	0.3884860	0.3888921	315
15	0.1071089	0.0984126	2128	0.8973314	0.8981276	398	0.3892631	0.3896138	331
16	-0.0897090	-0.0809988	-2140	-0.8988541	-0.8995110	+ 364	-0.3899223	-0.3902145	- 346
17	0.0722222	0.0635615	2151	0.9000981	0.9006157	330	0.3904695	0.3906942	362
18	0.0548358	0.0461060	2161	0.9010634	0.9014415	295	0.3908886	0.3910527	377
19	0.0373729	0.0286370	2170	0.9017498	0.9019884	260	0.3911866	0.3912901	393
20	0.0198990	-0.0111596	2179	0.9021572	0.9022562	225	0.3913634	0.3914064	408
21	-0.0024194	+0.0063209	-2187	-0.9022854	-0.9022449	+ 190	-0.3914191	-0.3914015	- 424
22	+0.0150607	0.0237995	2195	0.9021346	0.9019546	154	0.3913535	0.3912753	439
23	0.0325366	0.0412714	2202	0.9017048	0.9013852	118	0.3911667	0.3910279	455
24	0.0500032	0.0587313	2209	0.9009959	0.9005367	82	0.3908588	0.3906594	470
25	0.0674552	0.0761740	2214	0.9000078	0.8994091	45	0.3904297	0.3901697	485
26	+0.0848873	+0.0935943	-2219	-0.8987406	-0.8980024	+ 8	-0.3898794	-0.3895588	- 500
27	0.1022945	0.1109871	2223	0.8971944	0.8963167	- 29	0.3892079	0.3888268	515
28	0.1196715	0.1283470	2226	0.8953692	0.8943521	67	0.3881154	0.3879739	530
29	0.1370128	0.1456685	2228	0.8932653	0.8921089	105	0.3875022	0.3870003	545
30	0.1543131	0.1629462	2230	0.8908830	0.8895876	143	0.3864683	0.3859061	560
31	+0.1715669	+0.1801745	-2231	-0.8882228	-0.8867886	- 181	-0.3853138	-0.3846914	- 575
32	+0.1887685	+0.1973481	-2231	-0.8852850	-0.8837122	- 220	-0.3840389	-0.3833565	- 590

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.		Day of Month.	FEBRUARY.		Day of Month.	MARCH.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	105° 13' 6.6	-4° 58' 20.9	1.0	157° 28' 36.2	-2° 26' 7.2	1.0	165° 26' 32.4	-1° 44' 0.5
1.5	112 50 11.7	4 51 28.3	1.5	164 30 57.8	1 51 56.0	1.5	172 22 50.4	1 7 20.1
2.0	120 23 36.1	4 39 31.1	2.0	171 26 30.0	1 16 34.8	2.0	179 13 57.8	-0 30 6.3
2.5	127 52 5.8	4 22 51.8	2.5	178 15 4.6	0 40 39.9	2.5	185 59 38.8	+0 7 5.4
3.0	135 14 38.8	4 1 59.3	3.0	184 56 43.9	-0 4 44.9	3.0	192 39 45.5	0 43 42.0
3.5	142 30 27.0	-3 37 27.0	3.5	191 31 39.3	+0 30 40.0	3.5	199 14 16.8	+1 19 14.1
4.0	149 38 57.0	3 9 51.0	4.0	198 0 10.0	1 5 8.4	4.0	205 43 18.9	1 53 15.9
4.5	156 39 50.3	2 39 48.0	4.5	204 22 41.8	1 38 17.1	4.5	212 7 3.9	2 25 24.8
5.0	163 33 1.4	2 7 54.2	5.0	210 39 45.2	2 9 46.3	5.0	218 25 49.4	2 55 21.8
5.5	170 18 36.8	1 34 44.4	5.5	216 51 54.4	2 39 19.1	5.5	224 39 57.8	3 22 51.3
6.0	176 56 53.2	-1 0 50.6	6.0	222 59 45.9	+3 6 40.9	6.0	230 49 55.5	+3 47 40.5
6.5	183 28 15.5	-0 26 42.1	6.5	229 3 57.7	3 31 39.4	6.5	236 56 12.1	4 9 39.1
7.0	189 53 14.1	+0 7 14.6	7.0	235 5 8.7	3 54 4.0	7.0	242 59 19.9	4 28 38.6
7.5	196 12 24.2	0 40 35.8	7.5	241 3 57.1	4 13 45.6	7.5	248 59 52.5	4 44 32.5
8.0	202 26 23.5	1 13 0.5	8.0	247 1 0.4	4 30 36.0	8.0	254 58 25.3	4 57 15.4
8.5	208 35 51.4	+1 44 9.9	8.5	252 56 55.1	+4 44 28.3	8.5	260 55 34.0	+5 6 43.3
9.0	214 41 27.4	2 13 47.1	9.0	258 52 15.1	4 55 16.0	9.0	266 51 54.4	5 12 52.9
9.5	220 43 50.6	2 41 37.2	9.5	264 47 32.9	5 2 53.9	9.5	272 48 1.9	5 15 41.9
10.0	226 43 38.5	3 7 26.4	10.0	270 43 18.2	5 7 17.2	10.0	278 44 31.6	5 15 8.4
10.5	232 41 26.7	3 31 2.2	10.5	276 39 57.6	5 8 22.3	10.5	284 41 56.6	5 11 11.8
11.0	238 37 48.6	+3 52 13.3	11.0	282 37 55.3	+5 6 6.6	11.0	290 40 48.7	+5 3 51.8
11.5	244 33 14.7	4 10 49.1	11.5	288 37 32.1	5 0 28.8	11.5	296 41 37.6	4 53 9.5
12.0	250 28 12.5	4 26 40.0	12.0	294 39 5.9	4 51 28.9	12.0	302 44 50.6	4 39 7.3
12.5	256 23 6.5	4 39 37.4	12.5	300 42 51.6	4 39 8.8	12.5	308 50 52.2	4 21 49.5
13.0	262 18 18.2	4 49 33.7	13.0	306 49 1.1	4 23 32.3	13.0	315 0 3.7	4 1 21.3
13.5	268 14 5.7	+4 56 22.5	13.5	312 57 43.8	+4 4 45.5	13.5	321 12 43.3	+3 37 51.2
14.0	274 10 44.6	4 59 58.4	14.0	319 9 6.7	3 42 56.8	14.0	327 29 5.1	3 11 29.6
14.5	280 8 27.8	5 0 17.8	14.5	325 23 14.5	3 18 17.4	14.5	333 49 20.2	2 42 30.2
15.0	286 7 25.9	4 57 18.3	15.0	331 40 11.0	2 51 0.8	15.0	340 13 35.5	2 11 9.5
15.5	292 7 47.9	4 50 59.7	15.5	337 59 58.2	2 21 23.3	15.5	346 41 54.0	1 37 47.3
16.0	298 9 41.0	+4 41 23.3	16.0	344 22 37.6	+1 49 44.0	16.0	353 14 15.1	+1 2 46.5
16.5	304 13 12.1	4 28 32.6	16.5	350 48 10.7	1 16 24.4	16.5	359 50 34.8	+0 26 33.4
17.0	310 18 27.6	4 12 33.2	17.0	357 16 38.9	0 41 48.2	17.0	6 30 45.6	-0 10 23.1
17.5	316 25 34.1	3 53 32.6	17.5	3 48 4.1	+0 6 21.2	17.5	13 14 37.2	0 47 31.9
18.0	322 34 38.8	3 31 40.8	18.0	10 22 29.0	-0 29 29.2	18.0	20 1 57.0	1 24 19.9
18.5	328 45 50.8	+3 7 9.6	18.5	16 59 57.0	-1 5 14.1	18.5	26 52 30.1	-2 0 12.7
19.0	334 59 20.5	2 40 12.9	19.0	23 40 32.2	1 40 23.8	19.0	33 46 0.3	2 34 36.1
19.5	341 15 20.1	2 11 6.5	19.5	30 24 19.2	2 14 27.9	19.5	40 42 10.2	3 6 56.2
20.0	347 34 4.2	1 40 8.4	20.0	37 11 22.5	2 46 55.8	20.0	47 40 41.5	3 36 40.4
20.5	353 55 49.4	1 7 38.2	20.5	44 1 46.2	3 17 17.1	20.5	54 41 15.9	4 3 18.5
21.0	0 20 54.4	+0 33 57.2	21.0	50 55 33.3	-3 45 2.3	21.0	61 43 34.8	-4 26 23.1
21.5	6 49 39.5	-0 0 31.3	21.5	57 52 44.2	4 9 42.8	21.5	68 47 19.9	4 45 30.1
22.0	13 22 25.8	0 35 22.3	22.0	64 53 17.2	4 30 51.8	22.0	75 52 13.0	5 0 19.6
22.5	19 59 34.8	1 10 9.1	22.5	71 57 6.0	4 48 4.8	22.5	82 57 56.2	5 10 36.1
23.0	26 41 27.1	1 44 23.6	23.0	79 4 0.2	5 1 0.4	23.0	90 4 11.6	5 16 8.8
23.5	33 28 21.6	-2 17 35.9	23.5	86 13 43.9	-5 9 20.8	23.5	97 10 41.3	-5 16 51.8
24.0	40 20 33.6	2 49 14.9	24.0	93 25 55.2	5 12 52.7	24.0	104 17 7.5	5 12 44.3
24.5	47 18 13.6	3 18 48.5	24.5	100 40 6.6	5 11 27.8	24.5	111 23 11.9	5 3 50.4
25.0	54 21 25.6	3 45 44.2	25.0	107 55 44.7	5 5 3.9	25.0	118 28 36.0	4 50 19.4
25.5	61 30 5.7	4 9 29.5	25.5	115 12 10.6	4 53 44.9	25.5	125 33 0.3	4 32 25.4
26.0	68 44 0.5	-4 29 33.5	26.0	122 28 41.3	-4 37 41.5	26.0	132 36 5.4	-4 10 27.0
26.5	76 2 45.9	4 45 27.6	26.5	129 44 30.9	4 17 10.6	26.5	139 37 31.3	3 44 47.3
27.0	83 25 46.9	4 56 46.7	27.0	136 58 52.1	3 52 35.5	27.0	146 36 57.9	3 15 52.8
27.5	90 52 17.4	5 3 11.0	27.5	144 10 57.8	3 24 24.5	27.5	153 34 4.8	2 44 13.2
28.0	98 21 21.1	5 4 27.3	28.0	151 20 3.0	2 53 10.7	28.0	160 28 32.4	2 10 20.8
28.5	105 51 53.2	5 0 29.5	28.5	158 25 26.7	2 19 30.1	28.5	167 20 2.0	1 34 49.3
29.0	113 22 43.3	-4 51 20.3	29.0	165 26 32.4	-1 44 0.5	29.0	174 8 15.9	-0 58 13.2
29.5	120 52 37.7	4 37 10.7	29.5	172 22 50.4	1 7 20.1	29.5	180 52 58.3	-0 21 7.0
30.0	128 20 23.0	4 18 19.7	30.0	179 13 57.8	-0 30 6.3	30.0	187 33 56.1	+0 15 56.0
30.5	135 44 49.6	3 55 13.8	30.5	185 59 38.8	+0 7 5.4	30.5	194 10 58.8	0 52 24.0
31.0	143 4 54.7	3 28 25.1	31.0	192 39 45.5	0 43 42.0	31.0	200 43 58.7	1 27 47.4
31.5	150 19 44.7	-2 58 30.0	31.5	199 14 16.8	+1 19 14.1	31.5	207 12 51.9	+2 1 39.4

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		Day of Month.	MAY.		Day of Month.	JUNE.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	213° 37' 36.3"	+2° 33' 36.5"	1.0	246° 46' 39.8"	+4° 35' 29.2"	1.0	291° 10' 59.9"	+4° 45' 16.2"
1.5	219 58 21.5	3 3 18.2	1.5	252 50 44.6	4 48 56.7	1.5	297 6 40.8	4 33 25.8
2.0	226 15 8.9	3 30 27.1	2.0	258 52 40.5	4 59 5.2	2.0	303 2 35.8	4 18 37.1
2.5	232 28 11.7	3 54 49.0	2.5	264 52 43.3	5 5 52.1	2.5	308 59 10.5	4 0 57.7
3.0	238 37 45.1	4 16 12.7	3.0	270 51 11.6	5 9 10.6	3.0	314 56 53.2	3 40 36.4
3.5	244 44 7.6	+4 34 29.3	3.5	276 48 27.0	+5 9 19.3	3.5	320 56 14.7	+3 17 43.0
4.0	250 47 41.1	4 49 32.2	4.0	282 44 53.9	5 6 1.8	4.0	326 57 48.0	2 52 28.2
4.5	256 48 50.2	5 1 17.0	4.5	288 40 59.4	4 59 27.2	4.5	333 2 8.4	2 25 4.0
5.0	262 48 2.5	5 9 40.6	5.0	294 37 12.9	4 49 39.3	5.0	339 9 52.5	1 55 43.6
5.5	268 45 47.9	5 14 41.3	5.5	300 34 5.9	4 36 42.9	5.5	345 21 37.8	1 24 42.0
6.0	274 42 37.8	+5 16 18.5	6.0	306 32 12.3	+4 20 43.7	6.0	351 38 1.9	+0 52 15.9
6.5	280 39 5.8	5 14 32.7	6.5	312 32 7.3	4 1 48.2	6.5	357 59 41.6	+0 18 44.1
7.0	286 35 45.8	5 9 24.8	7.0	318 34 27.2	3 40 3.8	7.0	4 27 11.6	-0 15 32.0
7.5	292 33 13.3	5 0 56.8	7.5	324 39 48.7	3 15 39.5	7.5	11 1 3.3	0 50 8.2
8.0	298 32 3.2	4 49 11.3	8.0	330 48 48.8	2 48 45.5	8.0	17 41 43.4	1 24 37.5
8.5	304 32 50.6	+4 34 12.1	8.5	337 2 3.5	+2 19 33.8	8.5	24 29 32.0	-1 58 30.0
9.0	310 36 10.1	4 16 4.0	9.0	343 20 7.4	1 48 18.9	9.0	31 24 40.5	2 31 12.7
9.5	316 42 34.6	3 54 53.0	9.5	349 43 32.0	1 15 17.4	9.5	38 27 10.6	3 2 10.3
10.0	322 52 35.2	3 30 47.1	10.0	356 12 45.5	0 40 49.2	10.0	45 36 51.9	3 30 46.1
10.5	329 6 40.6	3 3 56.1	10.5	2 48 11.2	+0 5 17.3	10.5	52 53 21.1	3 56 22.7
11.0	335 25 16.1	+2 34 32.3	11.0	9 30 6.0	-0 30 51.8	11.0	60 16 1.5	-4 18 23.9
11.5	341 48 43.3	2 2 51.0	11.5	16 18 39.1	1 7 8.0	11.5	67 44 2.3	4 36 16.0
12.0	348 17 19.1	1 29 10.6	12.0	23 13 51.0	1 42 58.0	12.0	75 16 21.1	4 49 30.1
12.5	354 51 15.1	0 53 52.9	12.5	30 15 32.4	2 17 45.4	12.5	82 51 44.4	4 57 43.6
13.0	1 30 36.9	+0 17 23.3	13.0	37 23 23.5	2 50 52.0	13.0	90 28 52.1	5 0 41.8
13.5	8 15 23.5	-0 19 49.1	13.5	44 36 53.4	-3 21 38.5	13.5	98 6 19.1	-4 58 19.1
14.0	15 5 27.3	0 57 12.1	14.0	51 55 20.4	3 49 26.3	14.0	105 42 42.3	4 50 39.3
14.5	22 0 33.7	1 34 10.7	14.5	59 17 53.2	4 13 39.0	14.5	113 16 41.8	4 37 55.0
15.0	29 0 21.1	2 10 7.9	15.0	66 43 32.4	4 33 43.9	15.0	120 47 5.8	4 20 27.1
15.5	36 4 21.4	2 44 25.6	15.5	74 11 12.9	4 49 14.0	15.5	128 12 52.9	3 58 43.1
16.0	43 12 0.8	-3 16 26.1	16.0	81 39 46.3	-4 59 49.2	16.0	135 33 14.2	-3 33 15.5
16.5	50 22 40.5	3 45 33.0	16.5	89 8 3.9	5 5 17.0	16.5	142 47 33.9	3 4 39.9
17.0	57 35 38.5	4 11 12.8	17.0	96 34 59.8	5 5 33.2	17.0	149 55 29.3	2 33 33.3
17.5	64 50 10.7	4 32 56.1	17.5	103 59 33.8	5 0 41.5	17.5	156 56 49.8	2 0 32.9
18.0	72 5 32.4	4 50 18.6	18.0	111 20 53.2	4 50 53.1	18.0	163 51 35.4	1 26 14.8
18.5	79 21 0.0	-5 3 1.7	18.5	118 38 14.7	-4 36 25.7	18.5	170 39 55.3	-0 51 13.0
19.0	86 35 52.6	5 10 53.1	19.0	125 51 5.0	4 17 42.0	19.0	177 22 5.7	-0 15 59.3
19.5	93 49 32.9	5 13 46.9	19.5	132 59 0.7	3 55 8.9	19.5	183 58 28.2	+0 18 57.1
20.0	101 1 28.1	5 11 43.5	20.0	140 1 48.3	3 29 16.0	20.0	190 29 26.0	0 53 9.8
20.5	108 11 10.6	5 4 49.1	20.5	146 59 22.6	3 0 34.3	20.5	196 55 32.5	1 26 15.0
21.0	115 18 18.4	-4 53 15.1	21.0	153 51 45.8	-2 29 35.9	21.0	203 17 10.5	+1 57 51.3
21.5	122 22 34.3	4 37 17.8	21.5	160 39 6.6	1 56 52.0	21.5	209 34 49.9	2 27 39.7
22.0	129 23 46.1	4 17 17.2	22.0	167 21 37.7	1 22 54.2	22.0	215 48 58.3	2 55 23.3
22.5	136 21 45.9	3 53 36.7	22.5	173 59 35.1	0 48 12.3	22.5	222 0 1.7	3 20 47.0
23.0	143 16 29.5	3 26 42.4	23.0	180 33 16.7	-0 13 15.2	23.0	228 8 23.9	3 43 37.7
23.5	150 7 55.2	-2 57 2.1	23.5	187 3 1.3	+0 21 29.8	23.5	234 14 26.7	+4 3 44.0
24.0	156 56 3.6	2 25 5.3	24.0	193 29 7.7	0 55 36.9	24.0	240 18 29.6	4 20 56.2
24.5	163 40 56.6	1 51 22.3	24.5	199 51 53.8	1 28 42.1	24.5	246 20 49.7	4 35 6.1
25.0	170 22 36.5	1 16 23.9	25.0	206 11 36.1	2 0 23.0	25.0	252 21 42.2	4 46 7.5
25.5	177 1 6.3	0 40 40.7	25.5	212 28 29.9	2 30 19.0	25.5	258 21 20.3	4 53 55.8
26.0	183 36 28.7	-0 4 43.0	26.0	218 42 48.7	+2 58 11.6	26.0	264 19 55.8	+4 58 27.9
26.5	190 8 46.1	+0 30 59.9	26.5	224 54 44.0	3 23 44.1	26.5	270 17 39.3	4 59 42.6
27.0	196 38 0.5	1 5 59.9	27.0	231 4 26.1	3 46 41.7	27.0	276 14 41.0	4 57 40.5
27.5	203 4 13.7	1 39 50.8	27.5	237 12 3.9	4 6 51.8	27.5	282 11 10.9	4 52 23.7
28.0	209 27 27.2	2 12 8.1	28.0	243 17 45.5	4 24 3.8	28.0	288 7 19.5	4 43 56.0
28.5	215 47 43.0	2 42 29.8	28.5	249 21 38.4	4 38 9.6	28.5	294 3 17.9	4 32 22.8
29.0	222 5 3.6	+3 10 36.3	29.0	255 23 50.6	+4 49 2.9	29.0	299 59 18.7	+4 17 51.1
29.5	228 19 31.9	3 36 10.6	29.5	261 24 30.2	4 56 39.5	29.5	305 55 36.3	4 0 29.4
30.0	234 31 12.8	3 58 58.2	30.0	267 23 46.4	5 0 57.2	30.0	311 52 27.0	3 40 27.1
30.5	240 40 12.7	4 18 47.4	30.5	273 21 49.7	5 1 55.6	30.5	317 50 9.3	3 17 55.2
31.0	246 46 39.8	4 35 29.2	31.0	279 18 52.8	4 59 36.0	31.0	323 49 4.7	2 53 5.8
31.5	252 50 44.6	+4 48 56.7	31.5	285 15 10.5	+4 54 1.5	31.5	329 49 37.0	+2 26 12.2

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	323° 49' 4.7	+2° 53' 5.8	1.0	10° 4' 54.5	-1° 13' 15.9	1.0	59° 54' 50.6	-4° 45' 3.5
1.5	329 49 37.0	2 26 12.2	1.5	16 27 47.7	1 46 18.2	1.5	66 49 7.2	4 59 25.3
2.0	335 52 12.5	1 57 28.7	2.0	22 55 10.7	2 18 23.4	2.0	73 47 46.6	5 9 32.2
2.5	341 57 20.1	1 27 11.0	2.5	29 27 29.0	2 49 5.2	2.5	80 50 43.3	5 15 7.4
3.0	348 5 31.0	0 55 35.8	3.0	36 5 6.3	3 17 56.4	3.0	87 57 47.0	5 15 57.2
3.5	354 17 18.0	+0 23 1.2	3.5	42 48 23.5	-3 44 29.1	3.5	95 8 41.4	-5 11 52.7
4.0	0 33 15.2	-0 10 13.1	4.0	49 37 37.2	4 8 15.1	4.0	102 23 3.1	5 2 50.1
4.5	6 53 57.1	0 43 45.5	4.5	56 32 58.8	4 28 45.9	4.5	109 40 22.1	4 48 51.9
5.0	13 19 57.9	1 17 13.1	5.0	63 34 32.3	4 45 33.9	5.0	117 0 1.9	4 30 6.8
5.5	19 51 49.9	1 50 10.5	5.5	70 42 13.1	4 58 13.2	5.5	124 21 20.2	4 6 50.7
6.0	26 30 2.4	-2 22 10.4	6.0	77 55 46.6	-5 6 20.5	6.0	131 43 29.8	-3 39 26.1
6.5	33 15 0.3	2 52 43.3	6.5	85 14 47.5	5 9 36.4	6.5	139 5 39.6	3 8 21.9
7.0	40 7 1.8	3 21 18.3	7.0	92 38 39.0	5 7 46.9	7.0	146 26 56.5	2 34 12.8
7.5	47 6 17.2	3 47 22.7	7.5	100 6 33.4	5 0 44.4	7.5	153 46 27.7	1 57 38.2
8.0	54 12 46.4	4 10 23.3	8.0	107 37 33.0	4 48 29.2	8.0	161 3 21.9	1 19 20.1
8.5	61 26 17.4	-4 29 47.3	8.5	115 10 31.6	-4 31 9.9	8.5	168 16 51.3	-0 40 2.1
9.0	68 46 25.1	4 45 3.7	9.0	122 44 17.5	4 9 3.8	9.0	175 26 13.3	-0 0 27.7
9.5	76 12 30.6	4 55 44.9	9.5	130 17 36.1	3 42 36.3	9.5	182 30 51.5	+0 38 41.7
10.0	83 43 41.1	5 1 28.1	10.0	137 49 13.4	3 12 20.6	10.0	189 30 16.8	1 16 47.7
10.5	91 18 51.2	5 1 57.4	10.5	145 17 58.9	2 38 55.4	10.5	196 24 7.7	1 53 15.8
11.0	98 56 45.4	-4 57 5.0	11.0	152 42 48.3	-2 3 3.4	11.0	203 12 10.7	+2 27 36.2
11.5	106 36 0.8	4 46 52.6	11.5	160 2 46.4	1 25 29.5	11.5	209 54 20.1	2 59 23.9
12.0	114 15 10.9	4 31 31.0	12.0	167 17 8.1	0 46 58.5	12.0	216 30 37.4	3 28 18.9
12.5	121 52 49.8	4 11 20.5	12.5	174 25 19.2	-0 8 13.3	12.5	223 1 11.0	3 54 5.7
13.0	129 27 36.4	3 46 49.4	13.0	181 26 57.3	+0 30 5.9	13.0	229 26 15.4	4 16 32.9
13.5	136 58 17.3	-3 18 32.5	13.5	188 21 50.4	+1 7 23.3	13.5	235 46 10.1	+4 35 32.9
14.0	144 23 50.9	2 47 9.5	14.0	195 9 56.9	1 43 7.4	14.0	242 1 19.1	4 51 0.8
14.5	151 43 27.4	2 13 22.1	14.5	201 51 23.7	2 16 52.0	14.5	248 12 9.9	5 2 54.4
15.0	158 56 31.0	1 37 52.9	15.0	208 26 25.4	2 48 15.0	15.0	254 19 12.8	5 11 13.6
15.5	166 2 39.0	1 1 23.1	15.5	214 55 22.9	3 16 58.6	15.5	260 23 0.0	5 15 59.4
16.0	173 1 41.5	-0 24 31.5	16.0	221 18 41.8	+3 42 49.0	16.0	266 24 5.1	+5 17 14.5
16.5	179 53 39.5	+0 12 6.3	16.5	227 36 51.3	4 5 35.5	16.5	272 23 2.5	5 15 2.3
17.0	186 38 43.4	0 47 58.6	17.0	233 50 22.7	4 25 10.1	17.0	278 20 26.7	5 9 27.2
17.5	193 17 11.4	1 22 37.6	17.5	239 59 49.2	4 41 27.2	17.5	284 16 51.9	5 0 34.2
18.0	199 49 27.4	1 55 39.1	18.0	246 5 44.5	4 54 23.0	18.0	290 12 51.8	4 48 29.1
18.5	206 15 59.6	+2 26 42.7	18.5	252 8 42.3	+5 3 55.3	18.5	296 8 58.6	+4 33 18.6
19.0	212 37 18.7	2 55 31.1	19.0	258 9 15.6	5 10 2.9	19.0	302 5 43.7	4 15 10.1
19.5	218 53 57.2	3 21 49.9	19.5	264 7 56.1	5 12 46.1	19.5	308 3 35.9	3 54 12.3
20.0	225 6 27.7	3 45 27.1	20.0	270 5 14.4	5 12 6.0	20.0	314 3 2.6	3 30 35.3
20.5	231 15 22.5	4 6 12.6	20.5	276 1 39.2	5 8 4.6	20.5	320 4 28.8	3 4 30.3
21.0	237 21 13.0	+4 23 58.1	21.0	281 57 37.2	+5 0 45.3	21.0	326 8 16.9	+2 36 10.7
21.5	243 24 28.7	4 38 37.2	21.5	287 53 33.1	4 50 12.1	21.5	332 14 46.5	2 5 51.5
22.0	249 25 37.4	4 50 5.0	22.0	293 49 49.6	4 36 30.6	22.0	338 24 14.5	1 33 49.9
22.5	255 25 4.8	4 58 17.5	22.5	299 46 47.3	4 19 47.8	22.5	344 36 55.3	1 0 25.2
23.0	261 23 13.7	5 3 12.3	23.0	305 44 44.2	4 0 11.7	23.0	350 52 59.8	+0 25 58.7
23.5	267 20 25.4	+5 4 48.3	23.5	311 43 57.0	+3 37 52.5	23.5	357 12 36.1	-0 9 6.1
24.0	273 16 58.4	5 3 5.7	24.0	317 44 40.7	3 13 1.7	24.0	3 35 49.5	0 44 23.5
24.5	279 13 9.7	4 58 6.4	24.5	323 47 8.5	2 45 52.7	24.5	10 2 42.6	1 19 26.5
25.0	285 9 13.9	4 49 53.3	25.0	329 51 32.8	2 16 40.9	25.0	16 33 15.4	1 53 46.8
25.5	291 5 24.6	4 38 31.1	25.5	335 58 4.5	1 45 43.2	25.5	23 7 25.5	2 26 55.2
26.0	297 1 54.7	+4 24 6.1	26.0	342 6 54.1	+1 13 18.6	26.0	29 45 8.0	-2 58 22.0
26.5	302 58 55.5	4 6 46.1	26.5	348 18 11.7	0 39 47.6	26.5	36 26 16.9	3 27 38.3
27.0	308 56 38.8	3 46 40.7	27.0	354 32 7.3	+0 5 32.4	27.0	43 10 44.3	3 54 15.7
27.5	314 55 16.3	3 24 0.9	27.5	0 48 50.9	-0 29 3.5	27.5	49 58 20.9	4 17 47.5
28.0	320 55 0.5	2 58 59.3	28.0	7 8 32.8	1 3 35.5	28.0	56 48 56.8	4 37 49.1
28.5	326 56 4.6	2 31 50.0	28.5	13 31 23.7	1 37 38.1	28.5	63 42 21.0	4 53 54.6
29.0	332 58 43.2	+2 2 48.7	29.0	19 57 34.5	-2 10 44.8	29.0	70 38 22.3	-5 5 57.3
29.5	339 3 12.7	1 32 12.3	29.5	26 27 16.6	2 42 29.1	29.5	77 36 48.6	5 13 30.1
30.0	345 9 50.8	1 0 19.1	30.0	33 0 41.4	3 12 23.9	30.0	84 37 27.3	5 16 26.0
30.5	351 18 57.6	+0 27 28.4	30.5	39 37 59.8	3 40 2.6	30.5	91 40 5.4	5 14 38.1
31.0	357 30 54.7	-0 5 59.1	31.0	46 19 22.0	4 4 59.0	31.0	98 44 28.9	5 8 4.5
31.5	3 46 5.4	-0 39 41.6	31.5	53 4 56.8	-4 26 47.2	31.5	105 50 22.8	-4 56 48.0

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		Day of Month.	NOVEMBER.		Day of Month.	DECEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	98° 44' 28.9	-5° 8' 4.5	1.0	152° 4' 35.4	-1° 59' 41.1	1.0	189° 53' 7.5	+1° 30' 54.3
1.5	105 50 22.8	4 56 48.0	1.5	159 1 12.8	1 24 11.3	1.5	196 30 13.5	2 3 36.4
2.0	112 57 30.9	4 40 56.3	2.0	165 55 45.8	0 47 39.0	2.0	203 4 18.0	2 34 22.2
2.5	120 5 35.4	4 20 42.2	2.5	172 48 10.3	-0 10 37.8	2.5	209 35 29.7	3 2 50.4
3.0	127 14 16.9	3 56 23.6	3.0	179 38 19.4	+0 26 18.6	3.0	216 3 55.2	3 28 41.9
3.5	134 23 14.0	-3 28 23.3	3.5	186 26 7.2	+1 2 37.2	3.5	222 29 39.7	+3 51 40.5
4.0	141 32 3.4	2 57 8.3	4.0	193 11 25.3	1 37 46.9	4.0	228 52 46.2	4 11 32.6
4.5	148 40 20.0	2 23 10.0	4.5	199 54 4.4	2 11 18.5	4.5	235 13 16.2	4 28 7.2
5.0	155 47 37.0	1 47 3.0	5.0	206 33 54.4	2 42 45.0	5.0	241 31 10.1	4 41 16.5
5.5	162 53 26.1	1 9 24.5	5.5	213 10 44.9	3 11 42.6	5.5	247 46 28.1	4 50 55.2
6.0	169 57 18.6	-0 30 52.8	6.0	219 44 25.5	+3 37 50.8	6.0	253 59 10.2	+4 57 0.9
6.5	176 58 45.6	+0 7 52.7	6.5	226 14 46.6	4 0 52.8	6.5	260 9 17.1	4 59 33.8
7.0	183 57 18.8	0 46 13.9	7.0	232 41 40.3	4 20 35.1	7.0	266 16 51.2	4 58 36.6
7.5	190 52 31.7	1 23 34.3	7.5	239 5 0.9	4 36 48.1	7.5	272 21 56.8	4 54 14.0
8.0	197 44 0.1	1 59 20.0	8.0	245 24 45.2	4 49 25.8	8.0	278 24 40.2	4 46 33.1
8.5	204 31 22.8	+2 33 0.6	8.5	251 40 53.7	+4 58 25.1	8.5	284 25 11.2	+4 35 42.3
9.0	211 14 22.8	3 4 10.1	9.0	257 53 30.6	5 3 46.2	9.0	290 23 42.4	4 21 51.4
9.5	217 52 47.4	3 32 26.5	9.5	264 2 43.7	5 5 31.5	9.5	296 20 29.9	4 5 11.4
10.0	224 26 29.0	3 57 32.4	10.0	270 8 45.3	5 3 45.8	10.0	302 15 53.3	3 45 54.4
10.5	230 55 24.9	4 19 14.6	10.5	276 11 51.8	4 58 35.4	10.5	308 10 15.9	3 24 13.0
11.0	237 19 37.8	+4 37 24.2	11.0	282 12 23.3	+4 50 8.1	11.0	314 4 4.1	3 0 20.4
11.5	243 39 15.7	4 51 55.7	11.5	288 10 44.1	4 38 32.8	11.5	319 57 48.1	2 34 30.1
12.0	249 54 31.5	5 2 47.0	12.0	294 7 21.8	4 23 59.2	12.0	325 52 0.8	2 6 56.4
12.5	256 5 42.9	5 9 58.0	12.5	300 2 47.4	4 6 37.5	12.5	331 47 18.2	1 37 53.9
13.0	262 13 11.4	5 13 31.5	13.0	305 57 34.6	3 46 38.4	13.0	337 44 18.4	1 7 37.6
13.5	268 17 22.7	+5 13 31.6	13.5	311 52 19.7	+3 24 13.2	13.5	343 43 41.6	+0 36 23.3
14.0	274 18 45.4	5 10 3.5	14.0	317 47 40.7	2 59 33.5	14.0	349 46 8.9	+0 4 28.0
14.5	280 17 51.0	5 3 13.8	14.5	323 44 17.2	2 32 51.8	14.5	355 52 22.4	-0 27 50.5
15.0	286 15 13.4	4 53 9.6	15.0	329 42 49.4	2 4 21.0	15.0	2 3 4.1	1 0 12.8
15.5	292 11 27.6	4 39 58.5	15.5	335 43 58.1	1 34 15.3	15.5	8 18 54.3	1 32 17.8
16.0	298 7 10.1	+4 23 48.8	16.0	341 48 23.6	+1 2 49.9	16.0	14 40 31.0	-2 3 42.7
16.5	304 2 58.1	4 4 49.6	16.5	347 56 44.7	+0 30 21.7	16.5	21 8 29.1	2 34 2.6
17.0	309 59 28.8	3 43 10.3	17.0	354 9 38.3	-0 2 50.6	17.0	27 43 17.6	3 2 50.7
17.5	315 57 18.7	3 19 1.2	17.5	0 27 38.3	0 36 26.2	17.5	34 25 19.0	3 29 38.3
18.0	321 57 3.8	2 52 33.8	18.0	6 51 14.3	1 10 2.0	18.0	41 14 47.0	3 53 55.4
18.5	327 59 18.6	+2 24 0.9	18.5	13 20 50.4	-1 43 12.4	18.5	48 11 44.9	-4 15 11.2
19.0	334 4 35.4	1 53 36.6	19.0	19 56 44.5	2 15 29.7	19.0	55 16 4.4	4 32 55.0
19.5	340 13 24.0	1 21 36.9	19.5	26 39 6.4	2 46 23.9	19.5	62 27 24.4	4 46 37.8
20.0	346 26 11.0	0 48 20.1	20.0	33 27 57.2	3 15 23.4	20.0	69 45 9.8	4 55 53.5
20.5	352 43 19.1	+0 14 6.6	20.5	40 23 8.2	3 41 55.6	20.5	77 8 33.0	5 0 20.8
21.0	359 5 6.5	-0 20 40.8	21.0	47 24 20.2	-4 5 27.9	21.0	84 36 34.1	-4 59 44.3
21.5	5 31 46.5	0 55 37.0	21.5	54 31 4.2	4 25 29.5	21.5	92 8 3.4	4 53 56.3
22.0	12 3 26.4	1 30 14.3	22.0	61 42 41.0	4 41 31.8	22.0	99 41 44.5	4 42 57.7
22.5	18 40 8.2	2 4 3.4	22.5	68 58 22.8	4 53 10.2	22.5	107 16 17.2	4 26 58.7
23.0	25 21 47.3	2 36 33.2	23.0	76 17 14.8	5 0 5.7	23.0	114 50 21.9	4 6 17.8
23.5	32 8 12.6	-3 7 12.0	23.5	83 38 17.7	-5 2 5.8	23.5	122 22 42.9	-3 41 21.4
24.0	38 59 7.3	3 35 27.7	24.0	91 0 30.0	4 59 5.1	24.0	129 52 11.9	3 12 42.5
24.5	45 54 8.9	4 0 49.6	24.5	98 22 50.5	4 51 5.7	24.5	137 17 50.3	2 40 58.8
25.0	52 52 49.7	4 22 48.6	25.0	105 44 21.8	4 38 17.0	25.0	144 38 51.0	2 6 50.8
25.5	59 54 38.3	4 40 58.7	25.5	113 4 11.9	4 20 55.5	25.5	151 54 38.8	1 31 0.0
26.0	66 59 0.5	-4 54 57.7	26.0	120 21 35.9	-3 59 23.5	26.0	159 4 50.5	-0 54 7.4
26.5	74 5 20.6	5 4 28.3	26.5	127 35 57.2	3 34 7.9	26.5	166 9 14.0	-0 16 52.3
27.0	81 13 2.8	5 9 17.8	27.0	134 46 48.5	3 5 39.1	27.0	173 7 46.6	+0 20 8.8
27.5	88 21 32.4	5 9 20.0	27.5	141 53 50.8	2 34 30.2	27.5	180 0 34.2	0 56 22.6
28.0	95 30 17.1	5 4 34.0	28.0	148 56 53.4	2 1 15.5	28.0	186 47 48.7	1 31 19.4
28.5	102 38 47.9	4 55 4.4	28.5	155 55 52.6	1 26 29.5	28.5	193 29 46.8	2 4 32.8
29.0	109 46 39.4	-4 41 1.5	29.0	162 50 50.1	-0 50 46.5	29.0	200 6 48.5	+2 35 40.0
29.5	116 53 30.4	4 22 40.2	29.5	169 41 52.2	-0 14 39.6	29.5	206 39 15.3	3 4 21.5
30.0	123 59 3.7	4 0 20.1	30.0	176 29 8.4	+0 21 19.3	30.0	213 7 29.6	3 30 20.5
30.5	131 3 5.9	3 34 24.4	30.5	183 12 49.6	0 56 40.0	30.5	219 31 53.5	3 53 23.2
31.0	138 5 26.6	3 5 19.5	31.0	189 53 7.5	1 30 54.3	31.0	225 52 47.7	4 13 18.4
31.5	145 5 58.4	-2 33 34.7	31.5	196 30 13.5	+2 3 36.4	31.5	232 10 31.3	+4 29 57.0

FOR GREENWICH MEAN NOON.						
Date.	THE MOON'S EQUATOR.			C Mean Longitude of the Moon.	Mean Solar Days.	Motion of (
	i Inclination to Earth's Equator.	Δ Ascend'g Node on Earth's Equator to Ascending Node on Ecliptic.	Ω' Ascend'g Node on Earth's Equator.			
Jan. 0	24° 54.8	8° 44.1	0° 33.9	90° 8.5	0.1	1° 19.06
10	24 55.0	8 14.1	0 31.9	221 54.4	0.2	2 38.12
20	24 55.1	7 44.1	0 30.0	353 40.2	0.3	3 57.18
30	24 55.2	7 14.1	0 28.0	125 26.0	0.4	5 16.23
Feb. 9	24 55.3	6 44.1	0 26.0	257 11.9	0.5	6 35.29
					0.6	7 54.35
19	24 55.4	6 14.0	0 24.1	28 57.7	0.7	9 13.41
March 1	24 55.5	5 44.0	0 22.1	160 43.5	0.8	10 32.47
11	24 55.6	5 14.0	0 20.2	292 29.4	0.9	11 51.53
21	24 55.7	4 44.0	0 18.3	64 15.2	1.0	13 10.58
31	24 55.7	4 14.0	0 16.4	196 1.1	2.0	26 21.17
					3.0	39 31.75
April 10	24 55.7	3 44.0	0 14.5	327 46.9	4.0	52 42.33
20	24 55.7	3 14.0	0 12.5	99 32.7	5.0	65 52.92
30	24 55.7	2 44.0	0 10.6	231 18.6	6.0	79 3.50
May 10	24 55.7	2 14.0	0 8.6	3 4.4	7.0	92 14.09
20	24 55.7	1 44.0	0 6.7	134 50.2	8.0	105 24.67
					9.0	118 35.25
30	24 55.7	1 14.0	0 4.7	266 36.1	10.0	131 45.84
June 9	24 55.7	0 44.0	0 2.8	38 21.9		
19	24 55.7	0 14.0	0 0.8	170 7.8	Hours.	°
29	24 55.7	359 44.0	359 58.9	301 53.6	1	0 32.94
July 9	24 55.7	359 14.0	359 57.0	73 39.4	2	1 5.88
					3	1 38.82
19	24 55.8	358 44.0	359 55.1	205 25.3	4	2 11.76
29	24 55.8	358 14.0	359 53.1	337 11.1	5	2 44.70
Aug. 8	24 55.8	357 44.0	359 51.2	108 56.9	6	3 17.05
18	24 55.8	357 14.0	359 49.2	240 42.8	7	3 50.59
28	24 55.7	356 44.0	359 47.3	12 28.6	8	4 23.53
					9	4 56.47
Sept. 7	24 55.7	356 14.0	359 45.3	144 14.4	10	5 29.41
17	24 55.6	355 44.0	359 43.4	276 0.3	11	6 2.35
27	24 55.5	355 14.0	359 41.4	47 46.1	12	6 35.29
Oct. 7	24 55.5	354 44.0	359 39.5	179 32.0	13	7 8.23
17	24 55.4	354 14.0	359 37.6	311 17.8	14	7 41.17
					15	8 14.11
27	24 55.3	353 44.0	359 35.7	83 3.6	16	8 47.06
Nov. 6	24 55.2	353 14.0	359 33.8	214 49.5	17	9 20.00
16	24 55.0	352 43.9	359 31.8	346 35.3	18	9 52.94
26	24 54.9	352 13.9	359 29.9	118 21.1	19	10 25.88
Dec. 6	24 54.8	351 43.9	359 27.9	250 7.0	20	10 58.82
					21	11 31.76
16	24 54.7	351 13.9	359 26.0	21 52.8	22	12 4.70
26	24 54.6	350 43.8	359 24.1	153 38.7	23	12 37.64
36	24 54.5	350 13.8	359 22.1	285 24.5	24	13 10.58

TABLE FOR THE LIBRATION OF THE MOON.

Argument,  $(\Omega - \lambda)$  or  $(\Omega - \lambda - 180^\circ)$ .

$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$		$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$	
0°	0.0	39	0° 0.0	180°	46°	0.6	56	1° 3.9	134°
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	$\infty$	1 28.8	90
45	0.6	55	1 2.8	135					
	$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$		$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$

 $\Delta \lambda$  has the sign of  $\tan (\lambda - \Omega)$  $a$  has the sign of  $\cos (\Omega - \lambda)$  $B$  has the sign of  $\sin (\Omega - \lambda)$

## FOR GREENWICH MEAN NOON.

Date.	Apparent Obliquity of the Ecliptic. (HANSEN.)	Equation of Equinoxes		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
		In Longitude.	In R. A.		Aberration.	Hor. Par.	
Jan. 0	23° 27' 5.31	+ 3.28	+ 0.201	0.00	— 20.80	9.00	189° 16.1
10	5.40	3.49	0.213	1.38	20.79	9.00	188 44.4
20	5.51	3.60	0.220	2.75	20.77	8.99	188 12.6
30	5.67	3.57	0.218	4.13	20.74	8.98	187 40.8
Feb. 9	5.84	3.40	0.208	5.50	20.71	8.96	187 9.1
19	23 27 5.99	+ 3.07	+ 0.188	6.88	— 20.67	8.94	186 37.3
March 1	6.10	2.62	0.160	8.26	20.63	8.92	186 5.5
11	6.17	2.07	0.127	9.63	20.57	8.90	185 33.7
21	6.17	1.48	0.090	11.01	20.51	8.87	185 2.0
31	6.10	0.90	0.055	12.38	20.45	8.85	184 30.2
April 10	23 27 5.99	+ 0.38	+ 0.023	13.76	— 20.39	8.82	183 58.4
20	5.83	— 0.03	— 0.002	15.14	20.34	8.80	183 26.6
30	5.64	0.34	0.021	16.51	20.29	8.78	182 54.9
May 10	5.44	0.51	0.031	17.89	20.24	8.76	182 23.1
20	5.27	0.53	0.032	19.26	20.19	8.74	181 51.3
30	23 27 5.11	— 0.43	— 0.026	20.64	— 20.16	8.72	181 19.5
June 9	5.00	— 0.23	— 0.014	22.02	20.13	8.71	180 47.8
19	4.93	0.00	0.000	23.39	20.11	8.71	180 16.0
29	4.94	+ 0.23	+ 0.014	24.77	20.11	8.70	179 44.3
July 9	5.01	0.43	0.026	26.14	20.10	8.70	179 12.5
19	23 27 5.11	+ 0.57	+ 0.035	27.52	— 20.12	8.71	178 40.7
29	5.27	0.59	0.036	28.90	20.14	8.72	178 8.9
Aug. 8	5.44	0.47	0.029	30.27	20.17	8.73	177 37.2
18	5.61	+ 0.22	+ 0.013	31.65	20.20	8.75	177 5.4
28	5.75	— 0.15	— 0.009	33.02	20.24	8.77	176 33.6
Sept. 7	23 27 5.86	— 0.62	— 0.038	34.40	— 20.29	8.79	176 1.8
17	5.91	1.19	0.073	35.78	20.35	8.81	175 30.1
27	5.90	1.78	0.109	37.15	20.41	8.84	174 58.3
Oct. 7	5.84	2.34	0.143	38.53	20.47	8.87	174 26.5
17	5.73	2.84	0.174	39.90	20.53	8.88	173 54.7
27	23 27 5.56	— 3.23	— 0.198	41.28	— 20.59	8.91	173 23.0
Nov. 6	5.37	3.47	0.212	42.66	20.64	8.93	172 51.2
16	5.20	3.55	0.217	44.03	20.69	8.95	172 19.4
26	5.03	3.51	0.215	45.41	20.73	8.97	171 47.6
Dec. 6	4.90	3.35	0.205	46.78	20.76	8.98	171 15.9
16	23 27 4.84	— 3.10	— 0.190	48.16	— 20.78	8.99	170 44.1
26	4.83	2.81	0.173	49.54	20.79	9.00	170 12.3
36	23 27 4.90	— 2.55	— 0.156	50.91	— 20.79	9.00	169 40.6
Mean Obliquity, 1885.0, 23° 27' 15".04 (HANSEN). Mean Obliquity, 1885.0, 23° 27' 14".73 (PETERS). Precession for 1885.5 . . . . . 50".2605      log 1.70122 Precession in a Solar Day . . . . . 0".1376      log 9.13863 Precession in a Sidereal Day . . . . . 0".1372      log 9.13744 Sun's Mean Equatorial Horizontal Parallax . 8".848      log 0.94685							Daily Motion of $\Omega$ — 3".177



*P A R T   I I*

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ASTRONOMICAL EPHEMERIS

FOR THE

MERIDIAN OF WASHINGTON

FORMULÆ FOR THE REDUCTION OF THE POSITIONS OF THE FIXED STARS, USING THE NOTATION OF BESSEL, AND THE CONSTANTS OF PETERS AND STRUVE.

NOTATION.

- $\tau$ , the time, reckoned in units of one year, from the beginning of the Besselian fictitious year, (1884, December 30<sup>d</sup>.469 = 1885, January 0<sup>d</sup>.0 — 0<sup>d</sup>.531, Washington mean time),  
 $\alpha_0, \delta_0$ , the star's mean right ascension and declination at the beginning of the fictitious year,  
 $\alpha, \delta$ , the star's apparent right ascension and declination at the time  $\tau$ ,  
 $\mu, \mu'$ , the annual proper motion in right ascension and declination,  
 $\odot$ , the sun's true longitude,  
 $\Omega$ , the longitude of the moon's ascending node,  
 $\omega$ , the obliquity of the ecliptic,  
 $\Gamma$ , the longitude of the sun's perigee,  
 $\Gamma'$ , the longitude of the moon's perigee,  
 $\zeta$ , the moon's mean longitude.

BESSELIAN STAR-NUMBERS.

$$\begin{aligned} A &= \tau - 0.34248 \sin \Omega & - 0.00011 \sin (3 \odot - \Gamma) \\ &+ 0.00410 \sin 2 \Omega & - 0.00005 \sin 2 (\odot - \Omega) \\ &- 0.02521 \sin 2 \odot & + 0.00010 \sin 2 (\odot - \Gamma') \\ &+ 0.00293 \sin (\odot + 82^\circ 8') & + 0.00009 \sin (2 \Gamma' - \Omega) \\ &+ 0.00025 \sin (2 \odot - \Omega) & + 0.00005 \cos \Gamma' \\ &- 0.00405 \sin 2 \zeta & + 0.00004 \sin 2 \Gamma' \\ &+ 0.00135 \sin (\zeta - \Gamma') \\ B &= -9.2239 \cos \Omega & - 0.0027 \cos (3 \odot - \Gamma) \\ &+ 0.0895 \cos 2 \Omega & + 0.0067 \cos (2 \odot - \Omega) \\ &- 0.5506 \cos 2 \odot & + 0.0024 \cos (2 \Gamma' - \Omega) \\ &- 0.0692 \cos (\odot + 280^\circ 57') & - 0.0023 \sin \Gamma' \\ &- 0.0886 \cos 2 \zeta & + 0.0008 \cos 2 \Gamma' \\ C &= -20.4451 \cos \omega \cos \odot \\ D &= -20.4451 \sin \odot \\ E &= -0.0461 \sin \Omega + 0''.0014 \sin 2 \Omega - 0''.0033 \sin 2 \odot \end{aligned}$$

BESSEL'S Star-Constants.

$$\begin{aligned} a &= 3''.07244 + 1''.33689 \sin \alpha_0 \tan \delta_0 = \text{precession in right ascension} \\ b &= \frac{1}{15} \cos \alpha_0 \tan \delta_0 \\ c &= \frac{1}{15} \cos \alpha_0 \sec \delta_0 \\ d &= \frac{1}{15} \sin \alpha_0 \sec \delta_0 \\ a' &= 20''.0533 \cos \alpha_0 = \text{precession in declination} \\ b' &= -\sin \alpha_0 \\ c' &= \tan \omega \cos \delta_0 - \sin \alpha_0 \sin \delta_0 \\ d' &= \cos \alpha_0 \sin \delta_0 \end{aligned}$$

Reduction to Apparent Position.

$$\begin{aligned} \alpha &= \alpha_0 + \tau \mu + Aa + Bb + Cc + Dd + E & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + Aa' + Bb' + Cc' + Dd' & (\text{in arc}) \end{aligned}$$

INDEPENDENT STAR-NUMBERS.

$$\begin{aligned} f &= 46''.0866 A + E \text{ (in arc)} = 3''.07244 A + \frac{1}{15} E \text{ (in time)} \\ g \sin G &= B & h \sin H &= C & i &= C \tan \omega \\ g \cos G &= 20''.0533 A & h \cos H &= D \end{aligned}$$

Reduction to Apparent Position.

$$\begin{aligned} \alpha &= \alpha_0 + f + \tau \mu + \frac{1}{15} g \sin (G + \alpha) \tan \delta + \frac{1}{15} h \sin (H + \alpha) \sec \delta & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + g \cos (G + \alpha) + h \cos (H + \alpha) \sin \delta + i \cos \delta & (\text{in arc}) \end{aligned}$$

NOTES.—(1) The independent star-numbers are more convenient, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy. Otherwise, the Besselian star-numbers are more convenient.

(2) In using the star-constants of the *British Association Catalogue*,  $a, b, c, d, a', b', c', d'$ , must be changed to  $c, d, a, b, -c', -d', -a', -b'$ , respectively.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Jan. 0	+8.8477	+0.9912	-0.5547	+1.3025	Feb. 15	+9.2927	+0.9508	-1.2004	+1.0378
1	8.8785	0.9900	0.5926	1.3009	16	9.2932	0.9495	1.2051	1.0255
2	8.9038	0.9881	0.6273	1.2992	17	9.2937	0.9490	1.2096	1.0126
3	8.9229	0.9860	0.6594	1.2973	18	9.2951	0.9494	1.2140	0.9992
4	8.9370	0.9839	0.6890	1.2953	<sup>h</sup> (10.0) 19	9.2979	0.9504	1.2182	0.9853
<sup>h</sup> (7.0) 5	+8.9468	+0.9823	-0.7166	+1.2932	20	+9.3026	+0.9517	-1.2222	+0.9708
6	8.9540	0.9813	0.7425	1.2909	21	9.3090	0.9527	1.2260	0.9556
7	8.9603	0.9812	0.7668	1.2884	22	9.3167	0.9532	1.2297	0.9308
8	8.9679	0.9818	0.7897	1.2858	23	9.3249	0.9529	1.2332	0.9232
9	8.9779	0.9829	0.8113	1.2830	24	9.3329	0.9517	1.2365	0.9058
10	+8.9910	+0.9842	-0.8317	+1.2801	25	+9.3398	+0.9498	-1.2397	+0.8876
11	9.0069	0.9853	0.8511	1.2770	26	9.3452	0.9473	1.2427	0.8685
12	9.0247	0.9858	0.8695	1.2738	27	9.3488	0.9447	1.2456	0.8483
13	9.0432	0.9856	0.8870	1.2704	28	9.3507	0.9425	1.2483	0.8270
14	9.0608	0.9845	0.9037	1.2668	Mar. 1	9.3512	0.9408	1.2509	0.8045
15	+9.0762	+0.9826	-0.9197	+1.2631	2	+9.3510	+0.9401	-1.2533	+0.7807
16	9.0887	0.9802	0.9350	1.2592	3	9.3508	0.9403	1.2556	0.7554
17	9.0980	0.9777	0.9496	1.2551	4	9.3513	0.9412	1.2577	0.7283
18	9.1044	0.9754	0.9636	1.2508	5	9.3531	0.9427	1.2597	0.6993
19	9.1088	0.9736	0.9771	1.2464	<sup>h</sup> (11.0) 6	9.3563	0.9443	1.2616	0.6681
<sup>h</sup> (8.0) 20	+9.1126	+0.9726	-0.9900	+1.2418	7	+9.3609	+0.9456	-1.2633	+0.6344
21	9.1164	0.9725	1.0023	1.2370	8	9.3664	0.9462	1.2648	0.5977
22	9.1220	0.9730	1.0142	1.2320	9	9.3723	0.9459	1.2662	0.5575
23	9.1300	0.9740	1.0257	1.2268	10	9.3777	0.9448	1.2675	0.5131
24	9.1404	0.9750	1.0367	1.2215	11	9.3822	0.9431	1.2687	0.4635
25	+9.1530	+0.9757	-1.0473	+1.2159	12	+9.3853	+0.9409	-1.2697	+0.4073
26	9.1669	0.9758	1.0575	1.2101	13	9.3870	0.9387	1.2706	0.3428
27	9.1810	0.9751	1.0674	1.2041	14	9.3874	0.9370	1.2713	0.2668
28	9.1941	0.9735	1.0769	1.1978	15	9.3870	0.9361	1.2719	0.1744
29	9.2053	0.9712	1.0861	1.1913	16	9.3864	0.9361	1.2724	0.0570
30	+9.2139	+0.9685	-1.0949	+1.1846	17	+9.3864	+0.9370	-1.2728	+0.8954
31	9.2200	0.9658	1.1034	1.1777	18	9.3875	0.9366	1.2730	0.6352
Feb. 1	9.2239	0.9634	1.1116	1.1705	19	9.3901	0.9406	1.2731	+8.8893
2	9.2261	0.9617	1.1195	1.1631	20	9.3942	0.9426	1.2731	-9.4417
3	9.2276	0.9609	1.1272	1.1554	21	9.3998	0.9441	1.2739	9.7995
<sup>h</sup> (9.0) 4	+9.2294	+0.9609	-1.1346	+1.1474	<sup>h</sup> (12.0) 22	+9.4058	+0.9449	-1.2726	-9.9928
5	9.2324	0.9616	1.1417	1.1391	23	9.4120	0.9448	1.2722	0.1259
6	9.2371	0.9626	1.1486	1.1305	24	9.4176	0.9438	1.2716	0.2275
7	9.2437	0.9635	1.1552	1.1217	25	9.4222	0.9423	1.2709	0.3096
8	9.2517	0.9640	1.1616	1.1125	26	9.4254	0.9406	1.2701	0.3786
9	+9.2607	+0.9638	-1.1678	+1.1029	27	+9.4271	+0.9390	-1.2692	-0.4378
10	9.2695	0.9627	1.1738	1.0930	28	9.4274	0.9380	1.2681	0.4899
11	9.2775	0.9608	1.1795	1.0828	29	9.4273	0.9378	1.2669	0.5362
12	9.2839	0.9583	1.1850	1.0722	30	9.4270	0.9365	1.2656	0.5781
13	9.2886	0.9556	1.1903	1.0612	31	9.4270	0.9402	1.2641	0.6158
14	+0.2914	+0.9529	-1.1954	+1.0497	32	+9.4281	+0.9424	-1.2625	-0.6506
15	+9.2927	+0.9508	-1.2004	+1.0378	33	+9.4305	+0.9448	-1.2607	-0.6826

$E = + 0.^m01$

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Apr. 1	+9.4281	+0.9424	-1.2625	-0.6506	May 17	+9.5691	+0.9827	-1.0046	-1.2361
2	9.4305	0.9448	1.2607	0.6826	18	9.5743	0.9822	0.9930	1.2407
3	9.4340	0.9471	1.2588	0.7122	19	9.5786	0.9813	0.9809	1.2451
4	9.4385	0.9488	1.2568	0.7399	20	9.5819	0.9802	0.9684	1.2493
5	9.4435	0.9497	1.2547	0.7658	21	9.5842	0.9794	0.9554	1.2534
(13. <sup>h</sup> ) 6	+9.4485	+0.9497	-1.2524	-0.7900	(16. <sup>h</sup> ) 22	+9.5857	+0.9791	-0.9419	-1.2573
7	9.4527	0.9490	1.2500	0.8129	23	9.5870	0.9796	0.9278	1.2611
8	9.4560	0.9477	1.2474	0.8345	24	9.5883	0.9810	0.9131	1.2647
9	9.4580	0.9464	1.2447	0.8549	25	9.5901	0.9830	0.8978	1.2681
10	9.4590	0.9454	1.2419	0.8742	26	9.5926	0.9853	0.8818	1.2714
11	+9.4592	+0.9450	-1.2389	-0.8927	27	+9.5960	+0.9877	-0.8650	-1.2746
12	9.4590	0.9454	1.2357	0.9102	28	9.6002	0.9898	0.8475	1.2776
13	9.4592	0.9468	1.2324	0.9269	29	9.6049	0.9912	0.8291	1.2805
14	9.4602	0.9490	1.2290	0.9429	30	9.6098	0.9918	0.8098	1.2832
15	9.4624	0.9517	1.2254	0.9582	31	9.6145	0.9915	0.7895	1.2858
16	+9.4660	+0.9543	-1.2216	-0.9728	June 1	+9.6186	+0.9906	-0.7680	-1.2883
17	9.4708	0.9567	1.2177	0.9808	2	9.6219	0.9894	0.7453	1.2906
18	9.4764	0.9584	1.2136	1.0003	3	9.6244	0.9881	0.7213	1.2928
19	9.4823	0.9593	1.2094	1.0132	4	9.6261	0.9871	0.6957	1.2949
20	9.4879	0.9593	1.2050	1.0256	5	9.6274	0.9868	0.6683	1.2968
(14. <sup>h</sup> ) 21	+9.4928	+0.9586	-1.2004	-1.0375	(17. <sup>h</sup> ) 6	+9.6287	+0.9873	-0.6390	-1.2986
22	9.4965	0.9575	1.1957	1.0490	7	9.6303	0.9886	0.6075	1.3003
23	9.4991	0.9565	1.1908	1.0601	8	9.6325	0.9904	0.5734	1.3018
24	9.5005	0.9559	1.1857	1.0708	9	9.6355	0.9925	0.5363	1.3032
25	9.5013	0.9560	1.1804	1.0811	10	9.6395	0.9945	0.4955	1.3045
26	+9.5017	+0.9570	-1.1750	-1.0910	11	+9.6442	+0.9960	-0.4504	-1.3057
27	9.5024	0.9588	1.1693	1.1006	12	9.6493	0.9968	0.3999	1.3067
28	9.5038	0.9613	1.1634	1.1098	13	9.6545	0.9967	0.3427	1.3076
29	9.5063	0.9641	1.1574	1.1187	14	9.6593	0.9959	0.2766	1.3084
30	9.5098	0.9668	1.1511	1.1273	15	9.6635	0.9945	0.1985	1.3091
May 1	+9.5142	+0.9690	-1.1446	-1.1356	16	+9.6668	+0.9929	-0.1031	-1.3096
2	9.5192	0.9705	1.1379	1.1436	17	9.6693	0.9913	0.9803	1.3100
3	9.5242	0.9712	1.1309	1.1514	18	9.6712	0.9903	0.9089	1.3103
4	9.5289	0.9710	1.1237	1.1589	19	9.6726	0.9899	0.8211	1.3105
5	9.5327	0.9703	1.1163	1.1662	20	9.6739	0.9903	-0.2923	1.3105
(15. <sup>h</sup> ) 6	+9.5357	+0.9693	-1.1086	-1.1732	(18. <sup>h</sup> ) 21	+9.6755	+0.9914	+0.4663	-1.3105
7	9.5376	0.9684	1.1007	1.1800	22	9.6776	0.9929	0.7815	1.3104
8	9.5388	0.9681	1.0925	1.1865	23	9.6804	0.9947	0.9622	1.3101
9	9.5396	0.9685	1.0841	1.1928	24	9.6839	0.9961	0.0893	1.3097
10	9.5405	0.9697	1.0753	1.1989	25	9.6879	0.9971	0.1874	1.3092
11	+9.5420	+0.9717	-1.0662	-1.2048	26	+9.6921	+0.9972	+0.2673	-1.3085
12	9.5443	0.9743	1.0568	1.2105	27	9.6962	0.9965	0.3346	1.3077
13	9.5478	0.9770	1.0471	1.2160	28	9.6998	0.9951	0.3928	1.3068
14	9.5524	0.9794	1.0370	1.2213	29	9.7029	0.9932	0.4440	1.3058
15	9.5578	0.9813	1.0266	1.2264	30	9.7053	0.9912	0.4897	1.3047
16	+9.5635	+0.9824	-1.0158	-1.2313	31	+9.7070	+0.9894	+0.5308	-1.3034
17	+9.5691	+0.9827	-1.0046	-1.2361	32	+9.7082	+0.9882	+0.5684	-1.3020

E = + 0.00

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
July 1	+9.7070	+0.9894	+0.5308	-1.3034	Aug. 16	+9.7985	+0.9598	+1.1834	-1.0754
2	9.7082	0.9882	0.5684	1.3020	17	9.8001	0.9608	1.1885	1.0650
3	9.7092	0.9877	0.6028	1.3005	18	9.8021	0.9615	1.1934	1.0543
4	9.7104	0.9880	0.6346	1.2988	19	9.8045	0.9616	1.1982	1.0431
5	9.7120	0.9889	0.6641	1.2970	20	9.8069	0.9608	1.2028	1.0315
<sup>h</sup> (19.0) 6	+9.7143	+0.9902	+0.6916	-1.2951	<sup>h</sup> (22.0) 21	+9.8092	+0.9591	+1.2072	-1.0194
7	9.7173	0.9916	0.7174	1.2931	22	9.8111	0.9568	1.2115	1.0069
8	9.7209	0.9926	0.7416	1.2909	23	9.8124	0.9541	1.2156	0.9939
9	9.7250	0.9929	0.7644	1.2886	24	9.8132	0.9514	1.2196	0.9803
10	9.7292	0.9924	0.7860	1.2862	25	9.8135	0.9492	1.2234	0.9662
11	+9.7333	+0.9911	+0.8064	-1.2837	26	+9.8135	+0.9477	+1.2270	-0.9515
12	9.7368	0.9892	0.8258	1.2810	27	9.8135	0.9471	1.2305	0.9361
13	9.7397	0.9869	0.8443	1.2782	28	9.8136	0.9474	1.2338	0.9200
14	9.7419	0.9845	0.8619	1.2752	29	9.8142	0.9483	1.2370	0.9031
15	9.7434	0.9825	0.8787	1.2721	30	9.8153	0.9496	1.2401	0.8854
16	+9.7445	+0.9812	+0.8948	-1.2688	31	+9.8170	+0.9508	+1.2430	-0.8669
17	9.7453	0.9807	0.9101	1.2654	Sept. 1	9.8192	0.9516	1.2457	0.8474
18	9.7463	0.9810	0.9248	1.2618	2	9.8216	0.9516	1.2483	0.8268
19	9.7477	0.9818	0.9389	1.2581	3	9.8241	0.9507	1.2508	0.8050
20	9.7496	0.9829	0.9525	1.2543	4	9.8264	0.9490	1.2532	0.7820
<sup>h</sup> (20.0) 21	+9.7521	+0.9839	+0.9656	-1.2503	<sup>h</sup> (23.0) 5	+9.8282	+0.9467	+1.2554	-0.7576
22	9.7551	0.9845	0.9781	1.2461	6	9.8295	0.9442	1.2575	0.7315
23	9.7584	0.9843	0.9902	1.2417	7	9.8303	0.9419	1.2594	0.7036
24	9.7616	0.9833	1.0018	1.2372	8	9.8305	0.9402	1.2612	0.6736
25	9.7645	0.9815	1.0130	1.2325	9	9.8305	0.9393	1.2629	0.6413
26	+9.7670	+0.9791	+1.0238	-1.2277	10	+9.8305	+0.9393	+1.2645	-0.6062
27	9.7688	0.9765	1.0343	1.2227	11	9.8306	0.9402	1.2659	0.5679
28	9.7701	0.9739	1.0444	1.2175	12	9.8311	0.9417	1.2672	0.5257
29	9.7708	0.9719	1.0541	1.2121	13	9.8320	0.9434	1.2684	0.4788
30	9.7713	0.9706	1.0635	1.2065	14	9.8335	0.9448	1.2694	0.4259
31	+9.7718	+0.9702	+1.0726	-1.2007	15	+9.8353	+0.9457	+1.2703	-0.3657
Aug. 1	9.7726	0.9705	1.0814	1.1947	16	9.8373	0.9458	1.2711	0.2955
2	9.7740	0.9714	1.0899	1.1885	17	9.8391	0.9450	1.2718	0.2115
3	9.7759	0.9723	1.0981	1.1821	18	9.8408	0.9435	1.2723	0.1071
4	9.7785	0.9732	1.1060	1.1755	19	9.8419	0.9414	1.2727	9.9689
5	+9.7815	+0.9734	+1.1137	-1.1686	<sup>h</sup> (0.0) 20	+9.8426	+0.9393	+1.2730	-9.7648
<sup>h</sup> (21.0) 6	9.7847	0.9728	1.1212	1.1615	21	9.8428	0.9376	1.2731	-9.3657
7	9.7879	0.9714	1.1284	1.1541	22	9.8426	0.9365	1.2731	+9.0711
8	9.7907	0.9692	1.1354	1.1465	23	9.8423	0.9363	1.2730	9.6700
9	9.7930	0.9666	1.1421	1.1386	24	9.8422	0.9371	1.2728	9.9129
10	+9.7946	+0.9638	+1.1486	-1.1305	25	+9.8424	+0.9387	+1.2724	+0.0674
11	9.7956	0.9613	1.1549	1.1221	26	9.8431	0.9408	1.2719	0.1808
12	9.7962	0.9594	1.1610	1.1134	27	9.8444	0.9429	1.2713	0.2708
13	9.7965	0.9584	1.1669	1.1044	28	9.8462	0.9446	1.2706	0.3452
14	9.7969	0.9582	1.1726	1.0951	29	9.8483	0.9456	1.2697	0.4087
15	+9.7975	+0.9588	+1.1781	-1.0854	30	+9.8506	+0.9458	+1.2687	+0.4641
16	+9.7985	+0.9598	+1.1834	-1.0754	31	+9.8527	+0.9452	+1.2676	+0.5130

 $\pi = 0.''00$

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Oct. 1	+9.8527	+0.9452	+1.2676	+0.5130	Nov. 16	+9.9060	+0.9703	+1.0310	+1.2242
2	9.8545	0.9439	1.2663	0.5569	17	9.9064	0.9713	1.0199	1.2295
3	9.8559	0.9422	1.2649	0.5967	18	9.9070	0.9730	1.0083	1.2346
4	9.8567	0.9406	1.2633	0.6330	19	9.9080	0.9754	0.9962	1.2394
<sup>h</sup> (1.0) 5	9.8571	0.9395	1.2616	0.6664	<sup>h</sup> (4.0) 20	9.9095	0.9780	0.9836	1.2441
6	+9.8572	+0.9391	+1.2598	+0.6973	21	+9.9114	+0.9804	+0.9706	+1.2486
7	9.8571	0.9397	1.2579	0.7261	22	9.9138	0.9824	0.9570	1.2529
8	9.8572	0.9412	1.2558	0.7530	23	9.9164	0.9836	0.9428	1.2570
9	9.8576	0.9434	1.2536	0.7782	24	9.9191	0.9840	0.9279	1.2610
10	9.8585	0.9459	1.2512	0.8019	25	9.9216	0.9836	0.9124	1.2648
11	+9.8598	+0.9483	+1.2487	+0.8243	26	+9.9237	+0.9826	+0.8962	+1.2685
12	9.8615	0.9502	1.2460	0.8455	27	9.9255	0.9814	0.8792	1.2720
13	9.8634	0.9513	1.2432	0.8656	28	9.9268	0.9803	0.8614	1.2753
14	9.8654	0.9516	1.2402	0.8846	29	9.9278	0.9797	0.8426	1.2784
15	9.8672	0.9511	1.2371	0.9028	30	9.9286	0.9799	0.8220	1.2814
16	+9.8686	+0.9500	+1.2338	+0.9201	Dec. 1	+9.9293	+0.9809	+0.8021	+1.2842
17	9.8695	0.9487	1.2304	0.9366	2	9.9302	0.9826	0.7801	1.2869
18	9.8700	0.9476	1.2268	0.9524	3	9.9315	0.9847	0.7567	1.2895
19	9.8702	0.9471	1.2230	0.9675	<sup>h</sup> (5.0) 4	9.9332	0.9870	0.7318	1.2919
20	9.8701	0.9474	1.2191	0.9820	5	9.9352	0.9890	0.7053	1.2941
<sup>h</sup> (2.0) 21	+9.8702	+0.9486	+1.2150	+0.9959	6	+9.9375	+0.9904	+0.6769	+1.2962
22	9.8705	0.9506	1.2107	1.0093	7	9.9399	0.9910	0.6464	1.2981
23	9.8712	0.9532	1.2062	1.0221	8	9.9423	0.9908	0.6134	1.2999
24	9.8725	0.9559	1.2016	1.0344	9	9.9444	0.9898	0.5776	1.3016
25	9.8743	0.9584	1.1968	1.0463	10	9.9462	0.9883	0.5383	1.3031
26	+9.8766	+0.9603	+1.1918	+1.0578	11	+9.9476	+0.9868	+0.4950	+1.3045
27	9.8790	0.9614	1.1866	1.0689	12	9.9486	0.9855	0.4468	1.3057
28	9.8814	0.9617	1.1812	1.0795	13	9.9493	0.9848	0.3923	1.3068
29	9.8835	0.9612	1.1756	1.0898	14	9.9500	0.9848	0.3298	1.3078
30	9.8853	0.9602	1.1698	1.0997	15	9.9507	0.9857	0.2567	1.3086
31	+9.8866	+0.9592	+1.1638	+1.1092	16	+9.9517	+0.9872	+0.1685	+1.3092
Nov. 1	9.8874	0.9584	1.1575	1.1184	17	9.9532	0.9890	0.0573	1.3098
2	9.8879	0.9583	1.1510	1.1273	18	9.9550	0.9907	9.9076	1.3102
3	9.8883	0.9591	1.1443	1.1359	19	9.9572	0.9921	9.6767	1.3104
4	9.8887	0.9607	1.1373	1.1442	20	9.9598	0.9928	+9.1520	1.3106
<sup>h</sup> (3.0) 5	+9.8894	+0.9630	+1.1301	+1.1522	<sup>h</sup> (6.0) 21	+9.9624	+0.9927	-9.2822	+1.3106
6	9.8905	0.9657	1.1226	1.1600	22	9.9649	0.9918	9.7202	1.3104
7	9.8920	0.9685	1.1149	1.1675	23	9.9671	0.9902	9.9337	1.3101
8	9.8939	0.9708	1.1069	1.1747	24	9.9690	0.9883	0.0761	1.3097
9	9.8961	0.9725	1.0985	1.1817	25	9.9704	0.9864	0.1830	1.3092
10	+9.8983	+0.9733	+1.0899	+1.1885	26	+9.9715	+0.9848	-0.2686	+1.3085
11	9.9005	0.9733	1.0810	1.1950	27	9.9724	0.9839	0.3400	1.3076
12	9.9024	0.9727	1.0717	1.2013	28	9.9732	0.9838	0.4012	1.3066
13	9.9038	0.9717	1.0621	1.2074	29	9.9741	0.9844	0.4548	1.3055
14	9.9048	0.9707	1.0521	1.2132	30	9.9752	0.9856	0.5023	1.3043
15	+9.9055	+0.9701	+1.0418	+1.2188	31	+9.9766	+0.9870	-0.5449	+1.3029
16	+9.9060	+0.9703	+1.0310	+1.2242	32	+9.9793	+0.9883	-0.5837	+1.3014

E = - 0."01

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .		
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.						
Jan.	0	<sup>y</sup> 0.0028	<sup>a</sup> +3.25	<sup>o</sup> +0.217	<sup>h</sup> 81 48	<sup>h</sup> 5 27.2	<sup>h</sup> 349 52	23 19.5	+0.9957	+1.3093	-1.56	-0.1917	
	1	0.0056	3.49	0.233	81 11	5 24.7	348 56	23 15.7	0.9952	1.3091	1.69	0.2297	
	2	0.0083	3.70	0.247	80 37	5 22.5	347 59	23 11.9	0.9940	1.3088	1.84	0.2644	
	3	0.0110	3.87	0.258	80 10	5 20.6	347 2	23 8.2	0.9924	1.3085	1.98	0.2965	
	4	0.0138	4.00	0.266	79 48	5 19.2	346 6	23 4.4	0.9908	1.3082	2.12	0.3262	
	<sup>h</sup> (7.0)	5	0.0165	+4.09	+0.272	79 32	5 18.1	345 9	23 0.6	+0.9896	+1.3079	-2.26	-0.3539
	6	0.0193	4.15	0.277	79 20	5 17.3	344 12	22 56.8	0.9889	1.3076	2.40	0.3798	
	7	0.0220	4.21	0.281	79 11	5 16.7	343 15	22 53.0	0.9890	1.3072	2.54	0.4041	
	8	0.0247	4.29	0.286	79 0	5 16.0	342 18	22 49.2	0.9898	1.3068	2.67	0.4269	
	9	0.0275	4.39	0.293	78 47	5 15.2	341 21	22 45.4	0.9913	1.3064	2.81	0.4486	
	10	0.0302	+4.52	+0.302	78 29	5 13.9	340 24	22 41.6	+0.9930	+1.3060	-2.94	-0.4690	
	11	0.0329	4.69	0.313	78 6	5 12.4	339 27	22 37.8	0.9947	1.3056	3.08	0.4884	
	12	0.0357	4.89	0.326	77 38	5 10.5	338 29	22 33.9	0.9960	1.3051	3.21	0.5069	
	13	0.0384	5.10	0.340	77 6	5 8.4	337 32	22 30.1	0.9967	1.3047	3.34	0.5244	
	14	0.0412	5.31	0.354	76 33	5 6.2	336 34	22 26.3	0.9965	1.3042	3.48	0.5411	
	15	0.0439	+5.50	+0.367	76 2	5 4.1	335 36	22 22.4	+0.9957	+1.3037	-3.61	-0.5571	
	16	0.0466	5.66	0.378	75 34	5 2.2	334 38	22 18.6	0.9942	1.3032	3.74	0.5724	
	17	0.0494	5.78	0.386	75 11	5 0.7	333 40	22 14.7	0.9924	1.3027	3.87	0.5870	
	18	0.0521	5.87	0.392	74 54	4 59.6	332 42	22 10.8	0.9907	1.3021	3.99	0.6010	
19	0.0548	5.93	0.396	74 41	4 58.8	331 44	22 6.9	0.9893	1.3016	4.11	0.6144		
<sup>h</sup> (8.0)	20	0.0576	+5.98	+0.399	74 32	4 58.1	330 45	22 3.0	+0.9887	+1.3010	-4.24	-0.6273	
21	0.0603	6.04	0.402	74 24	4 57.6	329 47	21 59.1	0.9888	1.3005	4.36	0.6397		
22	0.0631	6.12	0.407	74 13	4 56.9	328 48	21 55.2	0.9897	1.2999	4.48	0.6516		
23	0.0658	6.23	0.415	73 59	4 55.9	327 49	21 51.3	0.9912	1.2993	4.60	0.6631		
24	0.0685	6.38	0.425	73 39	4 54.6	326 50	21 47.3	0.9930	1.2987	4.72	0.6741		
25	0.0713	+6.56	+0.438	73 13	4 52.9	325 51	21 43.4	+0.9946	+1.2981	-4.84	-0.6847		
26	0.0740	6.77	0.452	72 43	4 50.8	324 52	21 39.4	0.9959	1.2974	4.95	0.6949		
27	0.0767	7.00	0.467	72 9	4 48.6	323 52	21 35.5	0.9965	1.2968	5.07	0.7048		
28	0.0795	7.22	0.481	71 34	4 46.3	322 52	21 31.5	0.9964	1.2962	5.18	0.7143		
29	0.0822	7.40	0.494	71 2	4 44.1	321 53	21 27.5	0.9954	1.2955	5.29	0.7235		
30	0.0850	+7.55	+0.504	70 34	4 42.2	320 53	21 23.5	+0.9940	+1.2949	-5.40	-0.7323		
31	0.0877	7.66	0.511	70 12	4 40.8	319 53	21 19.5	0.9922	1.2942	5.51	0.7408		
Feb.	1	0.0904	7.73	0.515	69 56	4 39.7	318 52	21 15.5	0.9906	1.2936	5.61	0.7490	
2	0.0932	7.77	0.518	69 46	4 39.1	317 52	21 11.5	0.9894	1.2929	5.71	0.7570		
3	0.0959	7.79	0.520	69 40	4 38.7	316 51	21 7.4	0.9888	1.2923	5.82	0.7646		
<sup>h</sup> (9.0)	4	0.0987	+7.82	+0.522	69 35	4 38.4	315 51	21 3.4	+0.9891	+1.2916	-5.92	-0.7720	
5	0.1014	7.88	0.525	69 29	4 38.0	314 50	20 59.3	0.9900	1.2909	6.01	0.7791		
6	0.1041	7.97	0.531	69 20	4 37.3	313 48	20 55.2	0.9915	1.2903	6.11	0.7860		
7	0.1069	8.09	0.539	69 5	4 36.3	312 47	20 51.1	0.9931	1.2896	6.21	0.7927		
8	0.1096	8.24	0.549	68 45	4 35.0	311 46	20 47.1	0.9946	1.2889	6.31	0.7991		
9	0.1123	+8.41	+0.561	68 20	4 33.3	310 44	20 43.0	+0.9956	+1.2883	-6.39	-0.8053		
10	0.1151	8.58	0.572	67 53	4 31.5	309 42	20 38.8	0.9959	1.2876	6.47	0.8112		
11	0.1178	8.74	0.583	67 26	4 29.7	308 40	20 34.7	0.9955	1.2870	6.56	0.8169		
12	0.1206	8.87	0.592	67 0	4 28.0	307 38	20 30.6	0.9943	1.2863	6.64	0.8224		
13	0.1233	8.96	0.598	66 39	4 26.6	306 36	20 26.4	0.9927	1.2857	6.73	0.8278		
14	0.1260	+9.02	+0.602	66 23	4 25.6	305 34	20 22.3	+0.9909	+1.2851	-6.81	-0.8329		
15	0.1288	+9.05	+0.603	66 13	4 24.9	304 31	20 18.1	+0.9893	+1.2845	-6.88	-0.8378		

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
Feb. 15	<sup>y</sup> 0.1288	+ 9.05	+0.603	<sup>o</sup> 66 13	<sup>h</sup> 4 24.9	<sup>o</sup> 304 31	<sup>h</sup> 20 18.1	+0.9893	+1.2845	-6.98	-0.8378
16	0.1315	9.06	0.604	66 8	4 24.5	303 29	20 13.9	0.9883	1.2838	6.96	0.8425
17	0.1342	9.07	0.605	66 5	4 24.3	302 26	20 9.7	0.9880	1.2832	7.03	0.8470
18	0.1370	9.10	0.607	66 2	4 24.2	301 23	20 5.5	0.9886	1.2827	7.10	0.8514
<sup>h</sup> (10.0) 19	0.1397	9.16	0.611	65 57	4 23.8	300 19	20 1.3	0.9899	1.2821	7.17	0.8556
20	0.1425	+ 9.26	+0.617	65 47	4 23.1	299 16	19 57.1	+0.9917	+1.2815	-7.24	-0.8596
21	0.1452	9.40	0.626	65 31	4 22.1	298 13	19 52.8	0.9936	1.2809	7.30	0.8635
22	0.1479	9.57	0.638	65 9	4 20.6	297 9	19 48.6	0.9955	1.2804	7.36	0.8672
23	0.1507	9.75	0.650	64 43	4 18.9	296 6	19 44.4	0.9966	1.2799	7.42	0.8706
24	0.1534	9.93	0.662	64 15	4 17.0	295 2	19 40.1	0.9971	1.2794	7.48	0.8740
25	0.1561	+10.09	+0.672	63 47	4 15.2	293 58	19 35.9	+0.9969	+1.2789	-7.54	-0.8771
26	0.1589	10.22	0.681	63 23	4 13.5	292 54	19 31.6	0.9960	1.2784	7.59	0.8802
27	0.1616	10.30	0.687	63 3	4 12.2	291 50	19 27.3	0.9945	1.2780	7.64	0.8830
28	0.1644	10.34	0.689	62 50	4 11.3	290 46	19 23.0	0.9933	1.2775	7.69	0.8858
Mar. 1	0.1671	10.35	0.690	62 43	4 10.9	289 41	19 18.7	0.9921	1.2771	7.73	0.8883
2	0.1698	+10.35	+0.690	62 41	4 10.7	288 37	19 14.5	+0.9914	+1.2767	-7.77	-0.8906
3	0.1726	10.35	0.690	62 42	4 10.8	287 32	19 10.2	0.9915	1.2763	7.81	0.8930
4	0.1753	10.36	0.691	62 44	4 10.9	286 28	19 5.9	0.9924	1.2759	7.85	0.8952
5	0.1781	10.40	0.693	62 43	4 10.9	285 23	19 1.5	0.9940	1.2755	7.89	0.8971
<sup>h</sup> (11.0) 6	0.1808	10.48	0.698	62 37	4 10.5	284 19	18 57.2	0.9959	1.2752	7.93	0.8990
7	0.1835	+10.59	+0.706	62 27	4 9.8	283 14	18 52.9	+0.9979	+1.2749	-7.96	-0.9007
8	0.1863	10.72	0.715	62 11	4 8.7	282 9	18 48.6	0.9995	1.2746	7.99	0.9023
9	0.1890	10.87	0.724	61 51	4 7.4	281 4	18 44.3	1.0006	1.2744	8.01	0.9037
10	0.1917	11.01	0.733	61 29	4 5.9	279 59	18 39.9	1.0010	1.2742	8.03	0.9050
11	0.1945	11.12	0.741	61 8	4 4.5	278 54	18 35.6	1.0007	1.2740	8.06	0.9061
12	0.1972	+11.20	+0.746	60 50	4 3.4	277 49	18 31.3	+0.9997	+1.2738	-8.08	-0.9072
13	0.2000	11.24	0.749	60 37	4 2.5	276 44	18 26.9	0.9985	1.2736	8.09	0.9080
14	0.2027	11.25	0.750	60 30	4 2.0	275 39	18 22.6	0.9973	1.2735	8.11	0.9088
15	0.2054	11.24	0.749	60 28	4 1.9	274 34	18 18.3	0.9965	1.2734	8.12	0.9094
16	0.2082	11.22	0.748	60 30	4 2.0	273 29	18 13.9	0.9964	1.2733	8.13	0.9099
17	0.2109	+11.22	+0.748	60 33	4 2.2	272 24	18 9.6	+0.9970	+1.2732	-8.13	-0.9102
18	0.2136	11.25	0.750	60 35	4 2.3	271 19	18 5.3	0.9985	1.2732	8.14	0.9104
19	0.2164	11.32	0.755	60 33	4 2.2	270 14	18 0.9	1.0007	1.2731	8.14	0.9106
20	0.2191	11.43	0.762	60 26	4 1.7	269 9	17 56.6	1.0032	1.2731	8.14	0.9105
21	0.2219	11.57	0.772	60 12	4 0.8	268 4	17 52.3	1.0057	1.2732	8.14	0.9104
<sup>h</sup> (12.0) 22	0.2246	+11.73	+0.783	59 54	3 59.6	267 0	17 48.0	+1.0078	+1.2732	-8.13	-0.9100
23	0.2273	11.90	0.794	59 33	3 58.2	265 55	17 43.7	1.0093	1.2733	8.12	0.9096
24	0.2301	12.06	0.804	59 10	3 56.6	264 50	17 39.3	1.0101	1.2734	8.11	0.9091
25	0.2328	12.19	0.812	58 49	3 55.2	263 46	17 35.0	1.0102	1.2735	8.10	0.9083
26	0.2355	12.27	0.818	58 31	3 54.1	262 41	17 30.7	1.0097	1.2737	8.08	0.9076
27	0.2383	+12.31	+0.821	58 20	3 53.3	261 37	17 26.5	+1.0090	+1.2739	-8.07	-0.9066
28	0.2410	12.33	0.822	58 15	3 53.0	260 32	17 22.2	1.0084	1.2741	8.05	0.9056
29	0.2438	12.33	0.822	58 14	3 53.0	259 28	17 17.9	1.0082	1.2743	8.02	0.9043
30	0.2465	12.32	0.821	58 18	3 53.2	258 24	17 13.6	1.0087	1.2745	8.00	0.9030
31	0.2492	12.32	0.822	58 24	3 53.6	257 20	17 9.3	1.0099	1.2748	7.97	0.9015
32	0.2520	+12.35	+0.824	58 28	3 53.9	256 16	17 5.1	+1.0118	+1.2751	-7.94	-0.8999
33	0.2547	+12.41	+0.828	58 28	3 53.9	255 12	17 0.8	+1.0142	+1.2754	-7.91	-0.8982



## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
Apr.	1	0.2520	+12.35	+0.824	58 28	3 53.9	256 16	+1.0118	+1.2751	-7.94	-0.8999
	2	0.2547	12.41	0.828	58 28	3 53.9	255 12	1.0142	1.2754	7.91	0.8982
	3	0.2574	12.53	0.835	58 23	3 53.5	254 9	1.0169	1.2757	7.87	0.8962
	4	0.2602	12.66	0.844	58 14	3 52.9	253 5	1.0192	1.2761	7.84	0.8942
	5	0.2629	12.80	0.853	57 59	3 51.9	252 2	1.0213	1.2764	7.80	0.8922
	<sup>h</sup> (13.0) 6	0.2657	+12.94	+0.862	57 42	3 50.8	250 58	+1.0227	+1.2768	-7.76	-0.8899
	7	0.2684	13.07	0.871	57 24	3 49.6	249 55	1.0234	1.2772	7.72	0.8874
	8	0.2711	13.17	0.878	57 7	3 48.5	248 52	1.0235	1.2776	7.67	0.8849
	9	0.2739	13.23	0.882	56 55	3 47.7	247 50	1.0232	1.2781	7.62	0.8821
	10	0.2766	13.26	0.884	56 48	3 47.2	246 47	1.0228	1.2785	7.57	0.8793
	11	0.2794	+13.27	+0.885	56 46	3 47.1	245 45	+1.0225	+1.2790	-7.52	-0.8763
	12	0.2821	13.26	0.884	56 48	3 47.2	244 42	1.0228	1.2795	7.47	0.8732
	13	0.2848	13.27	0.885	56 53	3 47.5	243 40	1.0239	1.2800	7.41	0.8698
	14	0.2876	13.30	0.887	56 57	3 47.8	242 38	1.0257	1.2805	7.35	0.8664
	15	0.2903	13.37	0.891	56 58	3 47.9	241 36	1.0282	1.2810	7.29	0.8628
<sup>h</sup> (14.0)	16	0.2930	+13.48	+0.898	56 55	3 47.7	240 35	+1.0311	+1.2816	-7.23	-0.8591
	17	0.2958	13.63	0.908	56 46	3 47.1	239 34	1.0342	1.2822	7.16	0.8552
	18	0.2985	13.80	0.920	56 32	3 46.2	238 33	1.0371	1.2827	7.10	0.8511
	19	0.3013	13.99	0.932	56 14	3 44.9	237 32	1.0395	1.2833	7.03	0.8468
	20	0.3040	14.17	0.945	55 53	3 43.5	236 31	1.0413	1.2839	6.96	0.8425
	21	0.3067	+14.33	+0.956	55 33	3 42.2	235 30	+1.0424	+1.2845	-6.89	-0.8379
	22	0.3095	14.46	0.964	55 15	3 41.0	234 30	1.0429	1.2851	6.81	0.8332
	23	0.3122	14.54	0.970	55 2	3 40.1	233 30	1.0430	1.2857	6.73	0.8283
	24	0.3149	14.59	0.973	54 54	3 39.6	232 30	1.0431	1.2863	6.65	0.8231
	25	0.3177	14.62	0.974	54 52	3 39.4	231 30	1.0434	1.2869	6.57	0.8179
	26	0.3204	+14.63	+0.975	54 54	3 39.6	230 30	+1.0442	+1.2875	-6.49	-0.8124
	27	0.3232	14.65	0.977	54 58	3 39.9	229 31	1.0456	1.2881	6.41	0.8067
	28	0.3259	14.70	0.981	55 2	3 40.1	228 32	1.0478	1.2888	6.32	0.8009
	29	0.3286	14.79	0.986	55 3	3 40.2	227 33	1.0505	1.2894	6.23	0.7948
	30	0.3314	14.91	0.994	55 0	3 40.0	226 34	1.0534	1.2900	6.14	0.7885
May	1	0.3341	+15.06	+1.004	54 52	3 39.5	225 35	+1.0564	+1.2906	-6.05	-0.7821
	2	0.3368	15.23	1.015	54 39	3 38.6	224 37	1.0590	1.2913	5.96	0.7754
	3	0.3396	15.41	1.026	54 23	3 37.5	223 39	1.0612	1.2919	5.87	0.7685
	4	0.3423	15.58	1.038	54 4	3 36.3	222 41	1.0626	1.2926	5.77	0.7612
	5	0.3451	15.72	1.048	53 47	3 35.1	221 43	1.0635	1.2932	5.67	0.7537
	<sup>h</sup> (15.0) 6	0.3478	+15.82	+1.055	53 32	3 34.1	220 46	+1.0639	+1.2938	-5.57	-0.7461
	7	0.3505	15.89	1.059	53 22	3 33.5	219 48	1.0640	1.2944	5.47	0.7382
	8	0.3533	15.93	1.062	53 16	3 33.1	218 51	1.0642	1.2951	5.37	0.7300
	9	0.3560	15.96	1.064	53 15	3 33.0	217 54	1.0648	1.2957	5.27	0.7215
	10	0.3587	16.00	1.066	53 16	3 33.1	216 57	1.0659	1.2963	5.16	0.7127
	11	0.3615	+16.06	+1.070	53 17	3 33.1	216 0	+1.0678	+1.2969	-5.05	-0.7036
	12	0.3642	16.15	1.076	53 18	3 33.2	215 4	1.0702	1.2975	4.95	0.6943
	13	0.3670	16.27	1.085	53 15	3 33.0	214 8	1.0732	1.2981	4.84	0.6845
	14	0.3697	16.44	1.096	53 7	3 32.5	213 12	1.0764	1.2987	4.73	0.6745
	15	0.3724	16.65	1.110	52 54	3 31.6	212 16	1.0795	1.2992	4.61	0.6640
	16	0.3752	+16.87	+1.125	52 37	3 30.4	211 20	+1.0823	+1.2998	-4.50	-0.6532
	17	0.3779	+17.09	+1.139	52 16	3 29.1	210 24	+1.0846	+1.3004	-4.39	-0.6420

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Std. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
May	17	0.3779	+17.09	+1.139	52 16	3 29.1	210 24	+1.0846	+1.3004	-4.39	-0.6420
	18	0.3806	17.20	1.153	51 55	3 27.6	209 29	1.0863	1.3009	4.27	0.6304
	19	0.3834	17.46	1.164	51 34	3 26.3	208 34	1.0873	1.3015	4.15	0.6183
	20	0.3861	17.59	1.173	51 18	3 25.2	207 39	1.0879	1.3020	4.03	0.6058
	21	0.3889	17.60	1.180	51 5	3 24.4	206 44	1.0883	1.3025	3.92	0.5928
	(16.0) 22	0.3916	+17.76	+1.184	50 58	3 23.9	205 49	+1.0888	+1.3030	-3.80	-0.5793
	23	0.3943	17.81	1.187	50 55	3 23.7	204 54	1.0896	1.3035	3.67	0.5652
	24	0.3971	17.86	1.190	50 55	3 23.7	203 59	1.0910	1.3039	3.55	0.5505
	25	0.3998	17.93	1.195	50 56	3 23.8	203 5	1.0928	1.3044	3.43	0.5351
	26	0.4025	18.04	1.202	50 56	3 23.7	202 11	1.0953	1.3048	3.31	0.5192
	27	0.4053	+18.18	+1.212	50 52	3 23.5	201 17	+1.0981	+1.3053	-3.18	-0.5024
	28	0.4080	18.36	1.224	50 43	3 22.9	200 23	1.1010	1.3057	3.05	0.4849
	29	0.4108	18.56	1.237	50 31	3 22.0	199 29	1.1037	1.3061	2.93	0.4664
	30	0.4135	18.77	1.251	50 14	3 20.9	198 35	1.1060	1.3065	2.80	0.4471
	31	0.4162	18.97	1.265	40 55	3 19.6	197 41	1.1078	1.3068	2.67	0.4268
June	1	0.4190	+19.15	+1.277	49 35	3 18.4	196 48	+1.1090	+1.3072	-2.54	-0.4053
	2	0.4217	19.29	1.287	49 17	3 17.2	195 54	1.1097	1.3075	2.41	0.3826
	3	0.4245	19.40	1.294	49 3	3 16.2	195 1	1.1100	1.3079	2.28	0.3586
	4	0.4272	19.48	1.299	48 52	3 15.5	194 8	1.1102	1.3082	2.15	0.3329
	5	0.4299	19.54	1.303	48 46	3 15.0	193 14	1.1106	1.3085	2.02	0.3055
	(17.0) 6	0.4327	+19.60	+1.307	48 43	3 14.9	192 21	+1.1115	+1.3087	-1.89	-0.2764
	7	0.4354	19.67	1.312	48 41	3 14.8	191 28	1.1129	1.3089	1.76	0.2449
	8	0.4382	19.77	1.318	48 40	3 14.7	190 35	1.1149	1.3092	1.62	0.2107
	9	0.4409	19.91	1.327	48 36	3 14.4	189 42	1.1173	1.3094	1.49	0.1736
	10	0.4436	20.09	1.339	48 28	3 13.8	188 49	1.1202	1.3096	1.36	0.1329
	11	0.4464	+20.31	+1.354	48 16	3 13.0	187 57	+1.1231	+1.3098	-1.22	-0.0877
	12	0.4491	20.56	1.370	47 59	3 11.9	187 4	1.1258	1.3100	1.09	0.0372
	13	0.4518	20.80	1.387	47 38	3 10.6	186 11	1.1281	1.3101	0.96	9.9800
	14	0.4546	21.03	1.403	47 16	3 9.1	185 19	1.1299	1.3102	0.82	9.9140
	15	0.4573	21.23	1.416	46 54	3 7.6	184 26	1.1311	1.3103	0.69	9.8358
(18.0)	16	0.4601	+21.40	+1.427	46 34	3 6.3	183 33	+1.1318	+1.3104	-0.55	-9.7404
	17	0.4628	21.52	1.435	46 18	3 5.2	182 41	1.1322	1.3105	0.41	9.6178
	18	0.4655	21.61	1.441	46 7	3 4.5	181 48	1.1325	1.3105	0.28	9.4463
	19	0.4683	21.68	1.446	46 0	3 4.0	180 56	1.1330	1.3106	0.14	9.1584
	20	0.4710	21.75	1.450	45 56	3 3.7	180 3	1.1338	1.3106	-0.01	-7.9294
	21	0.4737	+21.83	+1.455	45 54	3 3.6	179 11	+1.1351	+1.3106	+0.13	+9.1038
	22	0.4765	21.94	1.462	45 52	3 3.5	178 18	1.1370	1.3106	0.26	9.4191
	23	0.4792	22.08	1.472	45 48	3 3.2	177 26	1.1392	1.3105	0.40	9.5907
	24	0.4820	22.26	1.484	45 40	3 2.6	176 33	1.1417	1.3105	0.53	9.7267
	25	0.4847	22.46	1.498	45 28	3 1.8	175 41	1.1441	1.3104	0.67	9.8247
	26	0.4874	+22.68	+1.512	45 12	3 0.8	174 48	+1.1463	+1.3102	+0.80	+9.9046
	27	0.4902	22.90	1.526	44 53	2 59.5	173 56	1.1480	1.3101	0.94	9.9720
	28	0.4929	23.09	1.539	44 33	2 58.2	173 3	1.1491	1.3100	1.07	0.0302
	29	0.4956	23.25	1.550	44 13	2 56.9	172 10	1.1498	1.3098	1.21	0.0813
	30	0.4984	23.38	1.559	43 56	2 55.7	171 18	1.1500	1.3096	1.34	0.1270
	31	0.5011	+23.47	+1.565	43 42	2 54.8	170 25	+1.1500	+1.3094	+1.47	+0.1682
	32	0.5039	+23.54	+1.568	43 32	2 54.1	169 32	+1.1501	+1.3092	+1.61	+0.2057

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .		
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.						
July	1	0.5011	+23.47	+1.565	43 42	2 54.8	170 25	11 21.7	+1.1500	+1.3094	+1.47	+0.1682	
	2	0.5039	23.54	1.568	43 32	2 54.1	169 32	11 18.1	1.1501	1.3092	1.61	0.2057	
	3	0.5066	23.59	1.572	43 26	2 53.8	168 39	11 14.6	1.1504	1.3090	1.74	0.2402	
	4	0.5093	23.66	1.577	43 23	2 53.5	167 47	11 11.1	1.1511	1.3088	1.87	0.2720	
	5	0.5121	23.75	1.583	43 20	2 53.3	166 54	11 7.6	1.1524	1.3085	2.00	0.3015	
	(19.0)	6	0.5148	+23.87	+1.592	43 16	2 53.1	166 1	11 4.1	+1.1543	+1.3082	+2.13	+0.3290
	7	0.5176	24.04	1.603	43 10	2 52.6	165 7	11 0.5	1.1565	1.3079	2.26	0.3548	
	8	0.5203	24.24	1.616	42 59	2 51.9	164 14	10 56.9	1.1589	1.3076	2.39	0.3790	
	9	0.5230	24.47	1.631	42 45	2 51.0	163 21	10 53.4	1.1612	1.3073	2.52	0.4017	
	10	0.5258	24.71	1.647	42 26	2 49.7	162 28	10 49.9	1.1633	1.3069	2.65	0.4234	
	11	0.5285	+24.94	+1.662	42 5	2 48.3	161 34	10 46.3	+1.1649	+1.3065	+2.78	+0.4439	
	12	0.5312	25.14	1.676	41 43	2 46.9	160 41	10 42.7	1.1660	1.3062	2.91	0.4633	
	13	0.5340	25.31	1.687	41 23	2 45.5	159 47	10 39.1	1.1666	1.3058	3.03	0.4814	
	14	0.5367	25.44	1.696	41 5	2 44.4	158 53	10 35.5	1.1668	1.3054	3.16	0.4993	
	15	0.5395	25.53	1.702	40 52	2 43.4	157 59	10 31.9	1.1669	1.3049	3.28	0.5161	
	16	0.5422	+25.59	+1.706	40 42	2 42.8	157 5	10 28.3	+1.1669	+1.3045	+3.41	+0.5321	
	17	0.5449	25.64	1.709	40 36	2 42.4	156 11	10 24.7	1.1672	1.3040	3.53	0.5474	
	18	0.5477	25.70	1.713	40 34	2 42.2	155 17	10 21.1	1.1679	1.3036	3.65	0.5622	
	19	0.5504	25.78	1.719	40 31	2 42.1	154 22	10 17.5	1.1691	1.3031	3.77	0.5703	
	20	0.5531	25.90	1.726	40 28	2 41.9	153 28	10 13.9	1.1706	1.3026	3.89	0.5899	
(30.0)	21	0.5559	+26.05	+1.736	40 23	2 41.5	152 34	10 10.3	+1.1725	+1.3021	+4.01	+0.6030	
22	0.5586	26.23	1.748	40 13	2 40.9	151 39	10 6.6	1.1745	1.3016	4.13	0.6155		
23	0.5614	26.42	1.762	40 0	2 40.0	150 44	10 2.9	1.1763	1.3010	4.24	0.6276		
24	0.5641	26.62	1.775	39 43	2 38.9	149 49	9 59.3	1.1777	1.3005	4.36	0.6392		
25	0.5669	26.80	1.787	39 25	2 37.6	148 54	9 55.6	1.1788	1.2999	4.47	0.6504		
26	0.5696	+26.95	+1.797	39 6	2 36.4	147 59	9 51.9	+1.1793	+1.2994	+4.58	+0.6613		
27	0.5723	27.06	1.805	38 49	2 35.2	147 3	9 48.2	1.1794	1.2988	4.70	0.6717		
28	0.5750	27.14	1.810	38 34	2 34.3	146 8	9 44.5	1.1791	1.2982	4.81	0.6817		
29	0.5778	27.19	1.813	38 23	2 33.6	145 12	9 40.8	1.1788	1.2977	4.92	0.6916		
30	0.5805	27.22	1.815	38 17	2 33.1	144 16	9 37.1	1.1786	1.2971	5.02	0.7010		
Aug.	31	0.5833	+27.26	+1.817	38 13	2 32.9	143 20	9 33.3	+1.1788	+1.2965	+5.13	+0.7101	
	1	0.5860	27.31	1.820	38 11	2 32.7	142 23	9 29.5	1.1794	1.2959	5.23	0.7189	
	2	0.5887	27.39	1.826	38 9	2 32.6	141 27	9 25.8	1.1805	1.2953	5.34	0.7274	
	3	0.5915	27.51	1.834	38 6	2 32.4	140 30	9 22.0	1.1821	1.2947	5.44	0.7356	
	4	0.5942	27.68	1.845	37 59	2 31.9	139 34	9 18.3	1.1840	1.2940	5.54	0.7435	
(31.0)	5	0.5970	+27.87	+1.858	37 48	2 31.2	138 37	9 14.5	+1.1860	+1.2934	+5.64	+0.7512	
6	0.5997	28.08	1.872	37 34	2 30.2	137 39	9 10.6	1.1878	1.2928	5.74	0.7586		
7	0.6024	28.28	1.886	37 16	2 29.1	136 42	9 6.8	1.1893	1.2922	5.83	0.7658		
8	0.6052	28.46	1.898	36 57	2 27.8	135 45	9 3.0	1.1903	1.2915	5.92	0.7727		
9	0.6079	28.61	1.908	36 38	2 26.6	134 47	8 59.1	1.1908	1.2909	6.02	0.7795		
10	0.6106	+28.72	+1.915	36 22	2 25.4	133 49	8 55.3	+1.1908	+1.2903	+6.11	+0.7860		
11	0.6134	28.79	1.920	36 9	2 24.6	132 51	8 51.4	1.1906	1.2896	6.20	0.7923		
12	0.6161	28.83	1.922	35 59	2 23.9	131 52	8 47.5	1.1904	1.2890	6.29	0.7984		
13	0.6188	28.85	1.923	35 54	2 23.6	130 54	8 43.6	1.1902	1.2884	6.37	0.8042		
14	0.6216	28.87	1.925	35 52	2 23.5	129 55	8 39.7	1.1904	1.2878	6.46	0.8100		
15	0.6243	+28.91	+1.928	35 52	2 23.5	128 56	8 35.7	+1.1910	+1.2871	+6.54	+0.8157		
16	0.6271	+28.98	+1.932	35 52	2 23.5	127 57	8 31.8	+1.1920	+1.2865	+6.62	+0.8209		

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Std. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
Aug. 16	<sup>y</sup> 0.6271	<sup>u</sup> +28.98	<sup>a</sup> +1.932	<sup>o</sup> 35 52	<sup>h</sup> 2 23.5	<sup>o</sup> 127 57	<sup>h</sup> 8 31.8	+1.1920	+1.2865	<sup>u</sup> +6.62	+0.8208
17	0.6298	29.08	1.939	35 50	2 23.3	126 58	8 27.9	1.1934	1.2859	6.70	0.8250
18	0.6325	29.22	1.948	35 45	2 23.0	125 58	8 23.9	1.1950	1.2853	6.77	0.8308
19	0.6353	29.38	1.959	35 36	2 22.4	124 50	8 19.9	1.1966	1.2847	6.85	0.8356
20	0.6380	29.55	1.970	35 24	2 21.6	123 59	8 15.9	1.1979	1.2841	6.92	0.8403
<sup>h</sup> (22.0) 21	0.6408	+29.70	+1.980	35 9	2 20.6	122 59	8 11.9	+1.1988	+1.2836	+6.99	+0.8447
22	0.6435	29.83	1.989	34 54	2 19.6	121 59	8 7.9	1.1993	1.2830	7.06	0.8490
23	0.6462	29.92	1.995	34 39	2 18.6	120 58	8 3.9	1.1994	1.2824	7.13	0.8531
24	0.6490	29.98	1.999	34 26	2 17.7	119 58	7 59.9	1.1990	1.2819	7.19	0.8570
25	0.6517	30.00	2.000	34 16	2 17.1	118 57	7 55.8	1.1985	1.2813	7.26	0.8608
26	0.6544	+29.99	+2.000	34 11	2 16.7	117 56	7 51.7	+1.1981	+1.2807	+7.32	+0.8644
27	0.6572	30.00	2.000	34 9	2 16.6	116 55	7 47.7	1.1978	1.2803	7.38	0.8679
28	0.6599	30.00	2.000	34 9	2 16.6	115 54	7 43.6	1.1980	1.2798	7.43	0.8712
29	0.6627	30.04	2.003	34 11	2 16.7	114 52	7 39.5	1.1987	1.2793	7.49	0.8745
30	0.6654	30.12	2.008	34 12	2 16.8	113 51	7 35.4	1.1999	1.2788	7.54	0.8775
31	0.6681	+30.24	+2.016	34 10	2 16.7	112 49	7 31.3	+1.2014	+1.2784	+7.59	+0.8804
Sept. 1	0.6709	30.39	2.026	34 5	2 16.3	111 47	7 27.1	1.2032	1.2779	7.64	0.8831
2	0.6736	30.56	2.037	33 55	2 15.7	110 45	7 23.0	1.2049	1.2775	7.69	0.8858
3	0.6763	30.74	2.049	33 43	2 14.9	109 43	7 18.9	1.2063	1.2771	7.73	0.8883
4	0.6791	30.90	2.060	33 29	2 13.9	108 40	7 14.7	1.2074	1.2767	7.77	0.8907
<sup>h</sup> (23.0) 5	0.6818	+31.03	+2.069	33 14	2 12.9	107 38	7 10.5	+1.2080	+1.2763	+7.81	+0.8928
6	0.6846	31.12	2.075	33 0	2 12.0	106 35	7 6.3	1.2081	1.2759	7.85	0.8949
7	0.6873	31.18	2.078	32 49	2 11.3	105 32	7 2.1	1.2080	1.2756	7.89	0.8969
8	0.6900	31.20	2.080	32 42	2 10.8	104 29	6 57.9	1.2076	1.2753	7.92	0.8987
9	0.6928	31.19	2.080	32 39	2 10.6	103 26	6 53.7	1.2074	1.2750	7.95	0.9004
10	0.6955	+31.19	+2.079	32 39	2 10.6	102 23	6 49.5	+1.2073	+1.2747	+7.98	+0.9019
11	0.6983	31.20	2.080	32 42	2 10.8	101 20	6 45.3	1.2077	1.2744	8.00	0.9033
12	0.7010	31.23	2.082	32 45	2 11.0	100 17	6 41.1	1.2085	1.2742	8.03	0.9046
13	0.7037	31.30	2.087	32 48	2 11.2	99 13	6 36.9	1.2096	1.2740	8.05	0.9058
14	0.7065	31.41	2.094	32 48	2 11.2	98 10	6 32.7	1.2111	1.2738	8.07	0.9069
15	0.7092	+31.54	+2.103	32 45	2 11.0	97 6	6 28.4	+1.2126	+1.2736	+8.09	+0.9077
16	0.7119	31.68	2.112	32 38	2 10.5	96 2	6 24.1	1.2141	1.2735	8.10	0.9085
17	0.7147	31.82	2.121	32 28	2 9.9	94 59	6 19.9	1.2152	1.2734	8.11	0.9092
18	0.7174	31.94	2.129	32 17	2 9.1	93 55	6 15.7	1.2159	1.2733	8.12	0.9096
19	0.7201	32.02	2.135	32 6	2 8.4	92 51	6 11.4	1.2161	1.2732	8.13	0.9101
<sup>h</sup> (0.0) 20	0.7229	+32.07	+2.138	31 56	2 7.7	91 47	6 7.1	+1.2160	+1.2732	+8.14	+0.9104
21	0.7256	32.08	2.139	31 49	2 7.2	90 43	6 2.9	1.2157	1.2731	8.14	0.9106
22	0.7284	32.07	2.138	31 45	2 7.0	89 38	5 58.6	1.2153	1.2731	8.14	0.9105
23	0.7311	32.05	2.137	31 46	2 7.1	88 34	5 54.3	1.2150	1.2732	8.14	0.9104
24	0.7338	32.04	2.136	31 49	2 7.3	87 30	5 50.0	1.2151	1.2732	8.13	0.9102
25	0.7366	+32.06	+2.137	31 54	2 7.6	86 26	5 45.7	+1.2157	+1.2733	+8.12	+0.9098
26	0.7393	32.11	2.141	31 59	2 7.9	85 22	5 41.5	1.2168	1.2733	8.12	0.9094
27	0.7421	32.20	2.147	32 2	2 8.1	84 18	5 37.2	1.2183	1.2735	8.11	0.9087
28	0.7448	32.33	2.156	32 2	2 8.1	83 14	5 32.9	1.2201	1.2736	8.09	0.9080
29	0.7475	32.49	2.166	31 58	2 7.8	82 9	5 28.6	1.2219	1.2738	8.07	0.9071
30	0.7503	+32.66	+2.178	31 50	2 7.3	81 5	5 24.3	+1.2236	+1.2740	+8.06	+0.9061
31	0.7530	+32.83	+2.188	31 40	2 6.7	80 1	5 20.1	+1.2250	+1.2742	+8.04	+0.9050

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .	
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
Oct.	<sup>y</sup> 1	0.7530	+32.83	+2.188	31 40	2 6.7	80 1	5 20.1	+1.2250	+1.2742	+8.04	+0.9050
	2	0.7557	32.96	2.197	31 29	2 5.9	78 57	5 15.8	1.2259	1.2744	8.01	0.9037
	3	0.7585	33.06	2.204	31 19	2 5.3	77 53	5 11.5	1.2264	1.2747	7.99	0.9023
	<sup>b</sup> (1.0) 4	0.7612	33.13	2.209	31 10	2 4.7	76 49	5 7.3	1.2266	1.2750	7.96	0.9007
	5	0.7640	33.16	2.211	31 5	2 4.3	75 45	5 3.0	1.2266	1.2753	7.93	0.8991
	6	0.7667	+33.16	+2.211	31 4	2 4.2	74 41	4 58.7	+1.2266	+1.2756	+7.89	+0.8972
	7	0.7694	33.16	2.211	31 6	2 4.4	73 37	4 54.5	1.2267	1.2759	7.86	0.8953
	8	0.7722	33.17	2.211	31 11	2 4.7	72 33	4 50.2	1.2271	1.2763	7.82	0.8932
	9	0.7749	33.20	2.213	31 17	2 5.1	71 30	4 46.0	1.2280	1.2767	7.78	0.8910
	10	0.7777	33.26	2.217	31 23	2 5.5	70 26	4 41.7	1.2293	1.2771	7.74	0.8886
	11	0.7804	+33.36	+2.224	31 26	2 5.8	69 23	4 37.5	+1.2309	+1.2775	+7.69	+0.8861
	12	0.7831	33.50	2.233	31 27	2 5.8	68 19	4 33.3	1.2327	1.2779	7.65	0.8834
	13	0.7859	33.65	2.243	31 24	2 5.6	67 16	4 29.1	1.2344	1.2783	7.60	0.8806
	14	0.7886	33.80	2.253	31 18	2 5.2	66 12	4 24.8	1.2359	1.2788	7.54	0.8776
	15	0.7913	33.94	2.262	31 10	2 4.7	65 9	4 20.6	1.2371	1.2793	7.49	0.8745
	16	0.7941	+34.05	+2.270	31 2	2 4.1	64 6	4 16.4	+1.2378	+1.2798	+7.43	+0.8712
	17	0.7968	34.12	2.275	30 54	2 3.6	63 3	4 12.2	1.2392	1.2803	7.37	0.8678
	18	0.7996	34.16	2.277	30 48	2 3.2	62 0	4 8.0	1.2383	1.2808	7.31	0.8642
	19	0.8023	34.17	2.278	30 46	2 3.1	60 58	4 3.9	1.2392	1.2814	7.25	0.8605
	20	0.8050	34.17	2.278	30 47	2 3.1	59 55	3 59.7	1.2393	1.2820	7.19	0.8565
	<sup>b</sup> (2.0) 21	0.8078	+34.17	+2.278	30 51	2 3.4	58 53	3 55.5	+1.2396	+1.2825	+7.12	+0.8524
	22	0.8105	34.19	2.280	30 57	2 3.8	57 51	3 51.4	1.2395	1.2831	7.05	0.8482
	23	0.8132	34.25	2.284	31 4	2 4.2	56 48	3 47.2	1.2406	1.2837	6.98	0.8437
	24	0.8160	34.35	2.290	31 9	2 4.6	55 46	3 43.1	1.2423	1.2843	6.90	0.8391
	25	0.8187	34.50	2.300	31 11	2 4.7	54 44	3 38.9	1.2443	1.2849	6.83	0.8343
	26	0.8215	+34.68	+2.312	31 10	2 4.7	53 42	3 34.8	+1.2464	+1.2855	+6.75	+0.8292
	27	0.8242	34.87	2.325	31 5	2 4.4	52 41	3 30.7	1.2485	1.2862	6.67	0.8241
	28	0.8269	35.06	2.338	30 58	2 3.9	51 39	3 26.6	1.2503	1.2868	6.59	0.8187
	29	0.8297	35.24	2.349	30 48	2 3.2	50 38	3 22.5	1.2518	1.2874	6.50	0.8131
	30	0.8324	35.38	2.359	30 39	2 2.6	49 37	3 18.5	1.2528	1.2881	6.42	0.8072
	31	0.8351	+35.48	+2.366	30 31	2 2.1	48 36	3 14.4	+1.2535	+1.2887	+6.33	+0.8012
Nov.	1	0.8379	35.55	2.370	30 25	2 1.7	47 35	3 10.3	1.2539	1.2894	6.24	0.7950
	2	0.8406	35.59	2.373	30 23	2 1.6	46 34	3 6.3	1.2543	1.2900	6.14	0.7885
	3	0.8434	35.62	2.375	30 25	2 1.6	45 33	3 2.2	1.2548	1.2907	6.05	0.7818
	4	0.8461	35.65	2.377	30 29	2 1.9	44 33	2 58.2	1.2554	1.2914	5.95	0.7748
	<sup>b</sup> (3.0) 5	0.8488	+35.71	+2.381	30 35	2 2.3	43 33	2 54.2	+1.2566	+1.2920	+5.86	+0.7676
	6	0.8516	35.80	2.387	30 40	2 2.7	42 32	2 50.1	1.2581	1.2927	5.76	0.7602
	7	0.8543	35.93	2.395	30 44	2 3.0	41 32	2 46.1	1.2599	1.2933	5.65	0.7524
	8	0.8571	36.09	2.406	30 46	2 3.1	40 33	2 42.2	1.2620	1.2940	5.55	0.7443
	9	0.8598	36.27	2.418	30 44	2 2.9	39 33	2 38.2	1.2640	1.2946	5.45	0.7360
	10	0.8625	+36.46	+2.431	30 39	2 2.6	38 33	2 34.2	+1.2659	+1.2953	+5.34	+0.7274
	11	0.8653	36.64	2.443	30 32	2 2.1	37 34	2 30.3	1.2675	1.2959	5.23	0.7185
	12	0.8680	36.80	2.453	30 23	2 1.5	36 35	2 26.3	1.2687	1.2965	5.12	0.7092
	13	0.8707	36.92	2.461	30 15	2 1.0	35 36	2 22.4	1.2695	1.2972	5.01	0.6995
	14	0.8735	37.01	2.467	30 8	2 0.5	34 37	2 18.5	1.2701	1.2978	4.89	0.6896
	15	0.8762	+37.06	+2.471	30 3	2 0.2	33 38	2 14.5	+1.2704	+1.2984	+4.78	+0.6792
	16	0.8790	+37.10	+2.474	30 2	2 0.2	32 39	2 10.6	+1.2708	+1.2990	+4.66	+0.6685

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
Nov. 16	<sup>y</sup> 0.8790	+37.10	+2.474	30 2	2 0.2	32 39	2 10.6	+1.2708	+1.2990	+4.66	+0.6685
17	0.8817	37.14	2.476	30 4	2 0.3	31 41	2 6.7	1.2714	1.2996	4.54	0.6573
18	0.8844	37.19	2.460	30 8	2 0.5	30 42	2 2.8	1.2723	1.3002	4.42	0.6457
19	0.8872	37.28	2.486	30 13	2 0.9	29 44	1 58.9	1.2736	1.3008	4.30	0.6337
<sup>h</sup> (4.0) 20	0.8899	37.40	2.494	30 17	2 1.1	28 46	1 55.1	1.2753	1.3013	4.18	0.6211
21	0.8926	+37.57	+2.505	30 18	2 1.2	27 48	1 51.2	+1.2774	+1.3018	+4.06	+0.6080
22	0.8954	37.78	2.518	30 17	2 1.1	26 50	1 47.3	1.2797	1.3024	3.93	0.5944
23	0.8981	38.01	2.534	30 12	2 0.8	25 52	1 43.5	1.2820	1.3029	3.80	0.5802
24	0.9009	38.24	2.550	30 4	2 0.3	24 55	1 39.7	1.2840	1.3035	3.68	0.5654
25	0.9036	38.46	2.564	29 54	1 59.6	23 57	1 35.8	1.2858	1.3040	3.55	0.5499
26	0.9063	+38.66	+2.577	29 44	1 58.9	23 0	1 32.0	+1.2872	+1.3044	+3.42	+0.5337
27	0.9091	38.81	2.588	29 34	1 58.2	22 2	1 28.1	1.2882	1.3049	3.29	0.5167
28	0.9118	38.93	2.596	29 25	1 57.7	21 5	1 24.3	1.2890	1.3054	3.16	0.4989
29	0.9145	39.02	2.602	29 20	1 57.3	20 8	1 20.5	1.2896	1.3059	3.02	0.4801
30	0.9173	39.09	2.606	29 18	1 57.2	19 11	1 16.7	1.2903	1.3062	2.89	0.4604
Dec. 1	0.9200	+39.16	+2.611	29 19	1 57.3	18 14	1 12.9	+1.2910	+1.3066	+2.75	+0.4395
2	0.9228	39.24	2.616	29 21	1 57.4	17 17	1 9.1	1.2921	1.3070	2.62	0.4175
3	0.9254	39.35	2.624	29 25	1 57.6	16 21	1 5.3	1.2936	1.3074	2.48	0.3941
4	0.9282	39.50	2.634	29 27	1 57.7	15 24	1 1.6	1.2954	1.3077	2.34	0.3693
<sup>h</sup> (5.0) 5	0.9310	39.69	2.646	29 26	1 57.7	14 27	0 57.8	1.2974	1.3080	2.20	0.3428
6	0.9337	+39.90	+2.660	29 23	1 57.5	13 31	0 54.1	+1.2995	+1.3083	+2.06	+0.3144
7	0.9365	40.12	2.675	29 17	1 57.1	12 34	0 50.3	1.3015	1.3086	1.92	0.2838
8	0.9392	40.34	2.690	29 8	1 56.5	11 38	0 46.5	1.3032	1.3089	1.78	0.2509
9	0.9419	40 54	2.703	28 58	1 55.9	10 41	0 42.7	1.3046	1.3092	1.64	0.2150
10	0.9447	40.70	2.714	28 47	1 55.1	9 45	0 39.0	1.3057	1.3094	1.50	0.1758
11	0.9474	+40.83	+2.723	28 38	1 54.5	8 49	0 35.3	+1.3064	+1.3096	+1.36	+0.1325
12	0.9501	40.93	2.729	28 30	1 54.0	7 53	0 31.5	1.3068	1.3098	1.21	0.0842
13	0.9529	41.00	2.733	28 25	1 53.7	6 56	0 27.7	1.3072	1.3100	1.07	0.0297
14	0.9556	41.06	2.737	28 23	1 53.5	6 0	0 24.0	1.3078	1.3101	0.93	0.9672
15	0.9584	41.13	2.742	28 23	1 53.5	5 4	0 20.3	1.3085	1.3103	0.78	9.8940
16	0.9611	+41.23	+2.749	28 25	1 53.7	4 8	0 16.5	+1.3097	+1.3104	+0.64	+9.8058
17	0.9638	41.36	2.758	28 26	1 53.7	3 12	0 12.8	1.3112	1.3105	0.50	9.6948
18	0.9666	41.54	2.770	28 26	1 53.7	2 16	0 9.1	1.3130	1.3105	0.35	9.5449
19	0.9693	41.76	2.784	28 23	1 53.5	1 20	0 5.3	1.3151	1.3106	0.21	9.3143
20	0.9720	42.00	2.800	28 17	1 53.1	0 24	0 1.6	1.3172	1.3106	+0.06	+8.7889
<sup>h</sup> (6.0) 21	0.9748	+42.25	+2.817	28 8	1 52.5	359 28	23 57.9	+1.3192	+1.3106	-0.08	-8.9206
22	0.9775	42.50	2.833	27 57	1 51.8	358 32	23 54.1	1.3209	1.3106	0.23	9.3579
23	0.9803	42.72	2.848	27 44	1 51.0	357 36	23 50.4	1.3223	1.3105	0.37	9.5714
24	0.9830	42.91	2.860	27 32	1 50.1	356 40	23 46.7	1.3234	1.3104	0.52	9.7137
25	0.9857	43.05	2.870	27 21	1 49.4	355 43	23 42.9	1.3241	1.3104	0.66	9.8206
26	0.9885	+43.16	+2.877	27 13	1 48.9	354 47	23 39.1	+1.3247	+1.3103	-0.81	-9.9062
27	0.9912	43.24	2.883	27 7	1 48.5	353 51	23 35.4	1.3252	1.3101	0.95	9.9776
28	0.9939	43.32	2.888	27 4	1 48.3	352 55	23 31.7	1.3258	1.3100	1.09	0.0389
29	0.9967	43.41	2.894	27 3	1 48.2	351 58	23 27.9	1.3266	1.3098	1.24	0.0924
30	0.9994	43.52	2.901	27 3	1 48.2	351 2	23 24.1	1.3277	1.3096	1.38	0.1399
31	1.0022	+43.66	+2.911	27 3	1 48.2	350 6	23 20.4	+1.3291	+1.3094	-1.52	-0.1826
32	1.0049	+43.84	+2.922	27 2	1 48.1	349 9	23 16.6	+1.3308	+1.3091	-1.66	-0.2212

MEAN PLACES FOR 1885.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.531, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
$\alpha$ Andromedæ . . . .	2.0	0 2 26.661	+ 3.0906	+ 28° 27' 19.65	+ 19.835
* $\beta$ Cassiopeæ . . . .	2.0	0 3 2.731	3.1717	+ 58 30 54.55	19.852
* 22 Andromedæ . . . .	5.3	0 4 20.771	3.1008	+ 45 25 55.51	20.036
4 Draconis (H.) . . S. P.	4.7	0 6 48.349	2.8913	+ 101 44 40.91	20.023
$\gamma$ Pegasi ( <i>Algenib</i> ) . .	2.7	0 7 18.870	3.0833	+ 14 32 38.93	20.025
* $\sigma$ Andromedæ . . . .	4.3	0 12 19.307	+ 3.1219	+ 36 8 51.03	+ 19.984
* $\epsilon$ Ceti . . . . .	3.3	0 13 33.964	3.0529	— 9 27 42.29	19.958
* 6 Ursæ Minoris . . S. P.	6.0	0 14 19.710	0.1110	+ 91 39 44.85	19.941
* 44 Piscium . . . . .	6.0	0 19 30.444	3.0730	+ 1 18 9.86	19.955
$\beta$ Hydri . . . . .	3.0	0 19 41.375	3.2378	— 77 54 7.23	20.287
12 Ceti . . . . .	6.0	0 24 10.183	+ 3.0610	— 4 35 34.16	+ 19.941
* $\kappa$ Draconis . . . . S. P.	3.3	0 28 34.261	2.5942	+ 109 34 40.10	19.893
* $\pi$ Andromedæ . . . .	4.0	0 30 44.386	3.1895	+ 33 5 9.79	19.874
$\alpha$ Cassiopeæ ( <i>var.</i> ) . .	2.5	0 33 59.187	3.3713	+ 55 54 23.08	19.793
$\beta$ Ceti . . . . .	2.0	0 37 49.020	3.0145	— 18 37 5.14	19.806
21 Cassiopeæ . . . . .	6.0	0 38 3.948	+ 3.8503	+ 74 21 33.30	+ 19.757
* $\phi$ Cassiopeæ . . . .	5.0	0 38 19.153	3.3174	+ 47 39 16.96	19.759
* $\delta$ Piscium . . . . .	4.3	0 42 42.952	3.1070	+ 6 57 32.22	19.653
32 <sup>3</sup> Camelop. (II.) . . S. P.	4.7	0 48 17.515	0.3832	+ 95 57 43.26	19.597
* $\gamma$ Cassiopeæ . . . .	2.0	0 49 46.392	3.5758	+ 60 5 37.13	19.569
* $\mu$ Andromedæ . . . .	4.0	0 50 22.303	+ 3.3097	+ 37 52 31.40	+ 19.622
* 43 Cephei (H.) . . .	4.3	0 53 12.157	7.1738	+ 85 38 22.47	19.515
$\epsilon$ Piscium . . . . .	4.0	0 56 58.494	3.1086	+ 7 16 14.59	19.460
$\beta$ Andromedæ . . . .	2.3	1 3 17.707	3.3430	+ 35 0 37.88	19.171
* $f$ Piscium . . . . .	5.0	1 11 52.014	3.0894	+ 3 0 30.55	19.041
* $\kappa$ Tucanæ . . . . .	5.0	1 11 52.133	+ 2.0560	— 69 29 13.01	+ 19.175
$\alpha$ Ursæ Minoris ( <i>Polaris</i> )	2.0	1 16 36.670	22.4630	+ 88 41 43.82	18.944
$\theta^1$ Ceti . . . . .	3.0	1 18 16.504	2.9969	— 8 46 37.51	18.675
38 Cassiopeæ . . . . .	6.3	1 22 41.054	4.3713	+ 69 40 19.87	18.687
$\eta$ Piscium . . . . .	3.7	1 25 19.813	3.2019	+ 14 45 9.46	18.672
* $\nu$ Andromedæ . . . .	4.0	1 30 3.007	+ 3.5027	+ 40 49 47.82	+ 18.155
* $\pi$ Piscium . . . . .	5.7	1 31 0.153	3.1699	+ 11 33 10.72	18.535
$\alpha$ Eridani ( <i>Achernar</i> ) .	1.0	1 33 25.532	2.2329	— 57 49 16.61	18.363
* $\nu$ Piscium . . . . .	4.7	1 35 26.822	3.1175	+ 4 54 18.95	18.338
$\phi$ Piscium . . . . .	4.3	1 39 19.285	3.1618	+ 8 34 42.17	18.226
* $\zeta$ Ceti . . . . .	3.0	1 45 47.038	+ 2.9617	— 10 54 16.09	+ 17.833
$\beta$ Arietis . . . . .	3.0	1 48 17.273	3.3027	+ 20 14 43.43	17.739
50 Cassiopeæ . . . . .	4.0	1 53 37.804	5.0027	+ 71 51 50.64	17.662
* $\gamma$ Andromedæ . . . .	2.3	1 56 50.549	3.6587	+ 41 46 38.17	17.455
$\alpha$ Arietis . . . . .	2.0	2 0 41.494	3.3701	+ 22 55 5.14	17.185
$\alpha$ Draconis . . . . S. P.	3.3	2 1 16.612	+ 1.6235	+ 115 4 27.78	+ 17.304
* $\beta$ Trianguli . . . .	3.0	2 2 42.160	3.5532	+ 34 26 33.81	17.216
$\xi^1$ Ceti . . . . .	4.3	2 6 54.318	+ 3.1736	+ 8 18 24.08	17.042
* 4 Ursæ Minoris . . S. P.	5.0	2 9 18.651	— 0.3296	+ 101 54 43.42	16.908
* $\gamma$ Trianguli . . . .	4.3	2 10 28.755	+ 3.5497	+ 33 18 52.94	16.858
* 67 Ceti . . . . .	6.0	2 11 14.823	+ 2.9891	— 6 57 9.85	+ 16.744
$\epsilon$ Cassiopeæ . . . .	4.0	2 19 35.852	4.8364	+ 66 53 3.99	16.452
* $\delta$ Hydri . . . . .	4.0	2 19 42.344	1.0534	— 69 10 58.21	16.455
$\xi^2$ Ceti . . . . .	4.0	2 22 2.721	+ 3.1832	+ 7 56 38.23	16.308
5 Ursæ Minoris . . S. P.	4.7	2 27 46.761	— 0.1955	+ 103 47 34.10	+ 16.011

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1885.0. (January 0 <sup>d</sup> .0—0 <sup>d</sup> .531, Washington.)					
Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
* δ Ceti . . . . .	4.0	<sup>h</sup> 2 <sup>m</sup> 33 <sup>s</sup> 35.306	+ 3.0724	— 0° 10' 6".16	+ 15".710
* μ Hydri . . . . .	6.0	2 34 7.743	— 1.4464	— 79 36 38.63	15.675
* θ Persei . . . . .	4.0	2 36 20.924	+ 4.0675	+ 48 44 28.10	15.475
γ Ceti . . . . .	3.3	2 37 20.511	+ 3.1028	+ 2 45 1.83	15.353
* σ Arietis . . . . .	5.7	2 45 8.639	+ 3.3038	+ 14 36 26.70	15.023
* 47 Cephei (H.) . . . .	6.0	2 50 50.265	+ 7.7017	+ 78 57 44.64	+ 14.729
β Ursæ Minoris . . S. P.	2.0	2 51 2.991	— 0.2356	+ 105 22 28.36	14.718
* ε Arietis . . . . .	4.3	2 52 38.225	+ 3.4202	+ 20 52 46.85	14.622
α Ceti . . . . .	2.3	2 56 16.088	+ 3.1299	+ 3 38 16.28	14.323
* β Persei ( <i>Algol</i> ) ( <i>var.</i> )	2.7	3 0 41.280	+ 3.8821	+ 40 30 41.67	14.139
48 Cephei (H.) . . . .	6.3	3 5 45.698	+ 7.3911	+ 77 18 37.25	+ 13.767
ζ Arietis . . . . .	4.7	3 8 17.519	+ 3.4386	+ 20 37 2.78	13.574
α Persei . . . . .	2.0	3 16 6.978	+ 4.2553	+ 49 27 2.81	13.115
* ι Hydri . . . . .	5.0	3 18 50.680	— 1.6072	— 77 48 28.53	13.018
γ <sup>2</sup> Ursæ Minoris . . S. P.	3.0	3 20 55.086	— 0.1369	+ 107 45 24.48	12.810
* f Tauri . . . . .	4.0	3 24 31.441	+ 3.3044	+ 12 32 30.36	+ 12.581
ε Eridani . . . . .	3.0	3 27 30.742	+ 2.8234	— 9 50 53.00	12.408
δ Persei . . . . .	3.3	3 34 44.405	+ 4.2481	+ 47 25 7.07	11.833
* γ Camelopardalis (H.).	4.3	3 38 13.944	+ 6.2313	+ 70 58 34.22	11.579
η Tauri . . . . .	3.0	3 40 38.927	+ 3.5561	+ 23 44 54.74	11.400
ζ Persei . . . . .	3.0	3 46 54.255	+ 3.7592	+ 31 32 27.50	+ 10.971
ζ Ursæ Minoris . . S. P.	4.3	3 48 11.218	— 2.2604	+ 101 51 8.19	10.909
* γ Hydri . . . . .	3.3	3 49 1.749	— 1.0018	— 74 35 28.14	10.976
* ε Persei . . . . .	3.3	3 50 8.245	+ 4.0086	+ 39 40 34.89	10.745
γ Eridani . . . . .	3.0	3 52 39.878	+ 2.7983	— 13 50 11.21	10.461
* A <sup>1</sup> Tauri . . . . .	4.7	3 57 53.838	+ 3.5393	+ 21 45 59.37	+ 10.104
* c Persei . . . . .	4.0	4 0 18.887	+ 4.3355	+ 47 24 14.99	9.965
Groombr. 2320 . . S. P.	6.3	4 6 0.488	+ 0.1380	+ 111 53 12.37	9.499
* o <sup>1</sup> Eridani . . . . .	4.3	4 6 15.117	+ 2.9265	— 7 8 18.13	9.634
γ Tauri . . . . .	4.0	4 13 14.965	+ 3.4085	+ 15 20 56.24	8.979
* η Ursæ Minoris . . S. P.	5.0	4 20 52.566	— 1.8216	+ 103 58 48.24	+ 8.151
ε Tauri . . . . .	3.7	4 21 54.102	+ 3.4969	+ 18 55 27.47	8.279
η Draconis . . . S. P.	2.7	4 22 26.225	+ 0.8055	+ 118 13 31.21	8.227
* m Persei . . . . .	6.0	4 25 19.500	+ 4.2089	+ 42 49 0.73	8.031
* δ Mensæ . . . . .	6.0	4 25 46.815	— 4.2362	— 80 28 55.38	8.018
A Draconis . . . S. P.	5.0	4 28 12.854	— 0.1368	+ 110 58 59.68	+ 7.797
α Tauri ( <i>Aldebaran</i> ) .	1.0	4 29 19.327	+ 3.4369	+ 16 16 37.39	7.537
* τ Tauri . . . . .	4.3	4 35 20.582	+ 3.5948	+ 22 44 6.49	7.208
α Camelopardalis . .	4.7	4 42 37.197	+ 5.9220	+ 66 8 43.55	6.641
* i Tauri . . . . .	5.3	4 44 38.819	+ 3.5049	+ 18 38 34.67	6.430
ι Aurigæ . . . . .	3.0	4 49 30.313	+ 3.9000	+ 32 58 58.06	+ 6.050
* ζ Aurigæ . . . . .	4.0	4 54 26.419	+ 4.1843	+ 40 54 23.88	5.653
ε Ursæ Minoris . . S. P.	4.3	4 57 47.218	— 6.3453	+ 97 46 30.86	5.379
11 Orionis . . . . .	5.0	4 57 59.856	+ 3.4240	+ 15 14 34.14	5.321
* β Eridani . . . . .	3.0	5 2 11.772	+ 2.9483	— 5 14 9.73	4.946
α Aurigæ ( <i>Capella</i> ) .	1.0	5 8 11.668	+ 4.4240	+ 45 52 46.47	+ 4.060
ρ Orionis ( <i>Rigel</i> ) . .	1.0	5 9 0.672	+ 2.8811	— 8 20 7.57	4.419
* τ Orionis . . . . .	4.0	5 12 1.344	+ 2.9124	— 6 58 11.16	4.156
β Tauri . . . . .	2.0	5 19 1.350	+ 3.7889	+ 28 30 32.62	3.386
Groombridge 966 . .	6.3	5 24 21.559	+ 7.9975	+ 74 57 54.23	+ 3.125

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.



MEAN PLACES FOR 1885.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.531, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	
* $\chi$ Aurigæ . . . . .	5.0	5 25 14.654	+ 3.9046	+ 32 6 21.54	+ 3.050
* Groombridge 944 . . .	6.3	5 25 15.140	+ 18.6250	+ 85 8 7.67	3.040
$\delta$ Orionis ( <i>var.</i> ) . . .	2.5	5 26 7.893	+ 3.0632	— 0 23 7.01	2.948
$\alpha$ Leporis . . . . .	3.0	5 27 39.495	+ 2.6447	— 17 54 19.67	2.820
$\epsilon$ Orionis . . . . .	2.0	5 30 22.682	+ 3.0422	— 1 16 34.87	2.586
$\alpha$ Columbæ . . . . .	2.0	5 35 29.149	+ 2.1726	— 34 8 10.10	+ 2.096
$\omega$ Draconis . . . S. P.	5.0	5 37 37.572	— 0.3543	+ 111 11 20.54	1.631
* $\kappa$ Orionis . . . . .	2.7	5 42 18.116	+ 2.8447	— 9 42 41.15	1.550
* $\nu$ Aurigæ . . . . .	4.0	5 43 31.148	+ 4.1541	+ 39 6 48.17	1.477
$\phi^1$ Draconis . . . S. P.	4.3	5 43 59.075	— 1.0799	+ 107 47 42.41	1.673
* $\delta$ Doradus . . . . .	4.3	5 44 34.231	+ 0.1044	— 65 46 42.85	+ 1.329
$\alpha$ Orionis ( <i>var.</i> ) . . .	1.2	5 48 56.750	+ 3.2469	+ 7 23 4.32	0.974
* $\beta$ Aurigæ . . . . .	2.0	5 51 5.603	+ 4.4015	+ 44 56 3.21	0.769
* $\theta$ Aurigæ . . . . .	3.0	5 51 52.796	+ 4.0919	+ 37 12 11.62	+ 0.622
$\nu$ Orionis . . . . .	4.7	6 1 0.407	+ 3.4273	+ 14 46 51.80	— 0.119
22 Camelopardalis (H.)	4.7	6 6 10.115	+ 6.6178	+ 69 21 28.99	— 0.658
* $\eta$ Geminorum . . . . .	3.3	6 7 56.186	+ 3.6227	+ 22 32 20.36	0.710
$\delta$ Ursæ Minoris . . S. P.	4.3	6 9 24.943	— 19.4535	+ 93 23 22.26	0.874
$\mu$ Geminorum . . . . .	3.0	6 16 0.217	+ 3.6315	+ 22 34 16.98	1.521
* $\phi^1$ Aurigæ . . . . .	5.3	6 16 2.484	+ 4.6267	+ 49 20 42.26	1.413
$\alpha$ Argus ( <i>Canopus</i> ) . .	1.0	6 21 24.035	+ 1.3303	— 52 37 59.35	— 1.861
* $\nu$ Geminorum . . . . .	4.7	6 22 8.074	+ 3.5631	+ 20 17 1.49	1.956
* $\chi$ Draconis . . . S. P.	4.0	6 23 7.733	— 1.0792	+ 107 19 2.73	1.644
$\gamma$ Geminorum . . . . .	2.3	6 31 4.105	+ 3.4674	+ 16 29 46.76	2.757
* $\epsilon$ Geminorum . . . . .	3.3	6 36 51.379	+ 3.6935	+ 25 14 37.76	3.225
* $\phi^5$ Aurigæ . . . . .	5.7	6 38 26.931	+ 4.3294	+ 43 41 25.82	— 3.201
† $\alpha$ Canis Majoris ( <i>Sirius</i> )	1.0	6 40 4.840	+ 2.6437	— 16 33 33.19	4.696
* $\theta$ Geminorum . . . . .	3.3	6 45 12.568	+ 3.9608	+ 34 5 55.44	3.962
51 Cephei (H.) . . . . .	5.3	6 46 15.674	+ 30.0105	+ 87 13 25.37	4.113
* $\zeta$ Mensæ . . . . .	5.8	6 49 35.985	— 4.8949	— 80 41 26.21	4.225
50 Draconis . . . S. P.	6.0	6 50 4.592	— 1.9056	+ 104 42 7.98	— 4.421
$\epsilon$ Canis Majoris . . . .	1.7	6 54 6.400	+ 2.3576	— 28 48 59.00	4.703
* $\zeta$ Geminorum ( <i>var.</i> ) . .	4.0	6 57 17.760	+ 3.6526	+ 20 44 16.17	4.979
$\delta$ Canis Majoris . . . .	2.0	7 3 42.924	+ 2.4384	— 26 12 40.57	5.494
* 63 Aurigæ . . . . .	5.0	7 3 44.679	+ 4.1371	+ 39 30 25.14	5.487
* 25 Camelopardalis . . .	4.7	7 6 49.810	+ 12.9800	+ 82 37 45.65	— 5.796
* $\gamma^2$ Volantis ( <i>var.</i> ) . . .	4.7	7 9 43.346	— 0.4856	— 70 18 42.04	5.887
$\delta$ Draconis . . . S. P.	3.0	7 12 31.590	+ 0.0306	+ 112 32 26.69	6.326
$\delta$ Geminorum . . . . .	3.3	7 13 15.280	+ 3.5883	+ 22 11 34.67	6.317
$\tau$ Draconis . . . S. P.	4.7	7 17 45.600	— 1.1143	+ 106 51 30.04	6.782
Piazzii vii. 67 . . . . .	6.0	7 18 54.487	+ 6.3024	+ 68 41 55.47	— 6.806
* $\beta$ Canis Minoris . . . .	3.0	7 20 54.855	+ 3.2599	+ 8 31 11.99	6.971
$\alpha^2$ Geminorum ( <i>Castor</i> )	1.7	7 27 15.739	+ 3.8390	+ 32 8 22.86	7.530
† $\alpha$ Canis Min. ( <i>Procyon</i> )	1.0	7 33 16.904	+ 3.1437	+ 5 31 7.69	8.975
$\beta$ Geminorum ( <i>Pollux</i> )	1.3	7 38 16.699	+ 3.6799	+ 28 18 10.48	8.395
$\lambda$ Ursæ Minoris . . S. P.	6.3	7 38 56.310	— 63.6095	+ 91 2 40.38	— 8.402
* 26 Lyncis . . . . .	6.0	7 46 20.155	+ 4.3895	+ 47 51 41.03	8.994
* Groombridge 1374 . . .	5.7	7 46 24.549	+ 7.2940	+ 74 13 22.95	9.013
$\phi$ Geminorum . . . . .	5.0	7 46 27.523	+ 3.6805	+ 27 3 44.89	9.008
$\epsilon$ Draconis . . . S. P.	3.7	7 48 33.347	— 0.1773	+ 110 1 29.86	— 9.175

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

† Periodic corrections given in the Appendix are still to be applied to the positions of Sirius and Procyon.

MEAN PLACES FOR 1885.0. (January 0 <sup>d</sup> .0—0 <sup>d</sup> .531, Washington.)					
Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
* $\omega^1$ Cancri . . . . .	6.0	7 53 58.362	+ 3.6378	+ 25 42 24.39	— 9.558
3 Ursæ Majoris (H.) . .	5.7	8 1 21.575	+ 6.0543	+ 68 48 39.30	10.128
15 Argus ( $\epsilon$ ) . . . . .	3.0	8 2 38.797	+ 2.5544	— 23 58 24.37	10.181
* $\zeta^1$ Cancri . . . . .	4.7	8 5 36.965	+ 3.4469	+ 17 59 35.11	10.584
* $\beta$ Cancri . . . . .	3.7	8 10 16.687	+ 3.2588	+ 9 32 20.32	10.839
* $\kappa$ Cephei ( <i>pr.</i> ) . . S. P.	4.3	8 12 44.558	— 1.9158	+ 102 38 7.40	— 11.005
* 30 Monocerotis . . . .	3.7	8 19 54.822	+ 3.0001	— 3 31 55.23	11.491
* $\theta$ Chamæleontis . . . .	4.7	8 24 4.155	— 1.7030	— 77 6 46.67	11.770
$\eta$ Cancri . . . . .	5.7	8 26 3.501	+ 3.4789	+ 20 49 51.45	11.986
Groombr. 3241 . . S. P.	6.3	8 30 29.754	— 0.2169	+ 107 51 28.77	12.222
* $\sigma$ Hydræ . . . . .	5.0	8 32 44.857	+ 3.1461	+ 3 44 39.74	— 12.418
* $\gamma$ Cancri . . . . .	4.3	8 36 37.827	+ 3.4811	+ 21 52 52.27	12.707
$\epsilon$ Hydræ . . . . .	3.3	8 40 41.159	+ 3.1821	+ 6 50 23.87	12.990
* $\sigma^3$ Cancri ( <i>mean</i> ) . . . .	5.7	8 47 13.611	+ 3.6744	+ 31 0 50.70	13.390
$\iota$ Ursæ Majoris . . . .	3.0	8 51 19.796	+ 4.1353	+ 48 29 32.23	13.886
12 Year Cat. 1879 . S. P.	6.0	8 52 46.365	— 2.5351	+ 99 52 46.60	— 13.695
$\sigma^3$ Ursæ Majoris . . . .	5.0	9 0 15.725	+ 5.3608	+ 67 36 1.09	14.252
* $\kappa$ Cancri . . . . .	5.0	9 1 31.110	+ 3.2563	+ 11 7 49.31	14.277
* $\theta$ Hydræ . . . . .	4.0	9 8 22.878	+ 3.1264	+ 2 47 55.47	15.004
* $\beta$ Argus . . . . .	1.5	9 11 56.021	+ 0.6793	— 69 14 36.81	14.803
$\iota$ Argus . . . . .	2.0	9 14 0.569	+ 1.6013	— 58 47 33.62	— 14.991
* $\alpha$ Lyncis . . . . .	3.3	9 14 2.801	+ 3.6703	+ 34 52 40.57	15.011
$\alpha$ Cephei . . . . S. P.	2.7	9 15 50.073	+ 1.4369	+ 117 54 5.39	15.167
1 Draconis (H.) . . . .	4.3	9 20 36.695	+ 9.0339	+ 81 49 59.11	15.414
$\alpha$ Hydræ . . . . .	2.0	9 21 56.179	+ 2.9492	— 8 9 38.57	15.440
$d$ Ursæ Majoris . . . .	4.7	9 24 17.703	+ 5.4082	+ 70 20 5.09	— 15.540
$\theta$ Ursæ Majoris . . . .	3.0	9 25 9.586	+ 4.0436	+ 52 12 2.39	16.204
$\beta$ Cephei ( <i>pr.</i> ) . . S. P.	3.0	9 27 10.331	+ 0.7956	+ 109 56 38.70	15.753
* 10 Leonis Minoris . . .	4.7	9 27 10.598	+ 3.6954	+ 36 54 26.92	15.768
* $\sigma$ Leonis . . . . .	3.7	9 35 0.747	+ 3.2073	+ 10 24 53.68	16.211
* $\zeta$ Chamæleontis . . . .	5.0	9 37 14.159	— 1.5495	— 80 25 27.57	— 16.293
$\epsilon$ Leonis . . . . .	3.0	9 39 19.355	+ 3.4159	+ 24 18 11.41	16.414
11 Cephei . . . . S. P.	5.0	9 40 14.123	+ 0.9027	+ 109 13 4.64	16.535
$\mu$ Leonis . . . . .	4.0	9 46 13.328	+ 3.4229	+ 26 32 52.89	16.785
* 19 Leonis Minoris . . .	5.3	9 50 38.324	+ 3.6969	+ 41 36 9.64	16.950
79 Draconis . . . S. P.	6.3	9 51 25.986	+ 0.7313	+ 106 50 30.01	— 17.011
* $\pi$ Leonis . . . . .	5.0	9 54 8.156	+ 3.1747	+ 8 35 43.60	17.130
$\alpha$ Leonis ( <i>Regulus</i> ) . .	1.3	10 2 14.825	+ 3.2011	+ 12 31 43.72	17.465
32 Ursæ Majoris . . . .	6.0	10 9 40.331	+ 4.4258	+ 65 40 52.75	17.799
* $\lambda$ Ursæ Majoris . . . .	3.3	10 10 9.460	+ 3.6413	+ 43 29 16.50	17.863
$\gamma^1$ Leonis . . . . .	2.0	10 13 37.895	+ 3.3155	+ 20 25 22.18	— 18.078
* $\mu$ Hydræ . . . . .	4.0	10 20 31.768	+ 2.9005	— 16 14 59.46	18.303
* $\beta$ Leonis Minoris . . .	4.3	10 21 13.884	+ 3.4879	+ 37 17 45.94	18.306
* $\alpha$ Antliæ . . . . .	4.0	10 21 53.882	+ 2.7387	— 30 28 58.73	18.311
9 Draconis (H.) . . . .	4.7	10 25 17.924	+ 5.2751	+ 76 18 17.06	18.381
$\rho$ Leonis . . . . .	4.0	10 26 45.362	+ 3.1645	+ 9 53 52.71	— 18.425
226 Cephei (B.) . . S. P.	5.3	10 30 15.146	+ 1.0789	+ 104 21 58.28	18.596
* 41 Leonis Minoris . . .	5.7	10 37 9.728	+ 3.2715	+ 23 47 24.38	18.732
$\eta$ Argus ( <i>var.</i> ) . . . .	1-6	10 40 36.025	+ 2.3125	— 59 4 48.36	18.866
$\iota$ Leonis . . . . .	5.3	10 43 12.751	+ 3.1589	+ 11 9 12.28	— 18.967

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1885.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.531, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
* $\delta^2$ Chamæleonis . . . . .	5.0	10 44 41.278	+ 0.6112	— 79 56 1.70	— 19.002
$\epsilon$ Cephei . . . . . S. P.	3.3	10 45 35.194	2.1208	+ 114 24 15.73	18.873
* 46 Leonis Minoris . . . . .	4.0	10 46 52.710	3.3707	+ 34 50 4.95	19.289
* Groombridge 1706 . . . . .	6.0	10 50 43.464	4.9839	+ 78 23 9.35	19.172
$\alpha$ Ursæ Majoris . . . . .	2.0	10 56 37.395	+ 3.7511	+ 62 22 17.80	19.358
* $\eta$ Octantis . . . . .	6.0	11 0 4.590	— 0.2820	— 83 58 31.45	— 19.409
* $p^3$ Leonis . . . . .	6.0	11 1 2.258	+ 3.0622	+ 2 34 45.89	19.483
* $\phi$ Ursæ Majoris . . . . .	3.3	11 3 11.701	3.3950	+ 45 7 19.14	19.500
$\delta$ Leonis . . . . .	2.3	11 7 59.509	3.1988	+ 21 9 12.83	19.682
* $\nu$ Ursæ Majoris . . . . .	3.3	11 12 16.063	3.2587	+ 33 43 17.94	19.569
$\delta$ Crateris . . . . .	3.3	11 13 35.513	+ 2.9960	— 14 9 23.29	— 19.460
$\epsilon$ Cephei . . . . . S. P.	5.3	11 13 54.451	2.4421	+ 112 31 3.11	19.666
$\tau$ Leonis . . . . .	5.0	11 22 1.383	3.0862	+ 3 29 21.98	19.800
$\lambda$ Draconis . . . . .	3.3	11 24 33.880	3.6263	+ 69 57 56.32	19.835
* $\xi$ Hydræ . . . . .	4.0	11 27 20.769	2.9422	— 31 12 57.52	19.884
$\nu$ Leonis . . . . .	5.0	11 31 3.646	+ 3.0712	— 0 11 20.30	— 19.859
$\gamma$ Cephei . . . . . S. P.	3.3	11 34 37.895	2.4121	+ 103 0 34.40	20.074
* $\chi$ Ursæ Majoris . . . . .	3.7	11 39 58.522	3.1921	+ 48 25 1.06	19.961
$\beta$ Leonis . . . . .	2.0	11 43 11.610	3.0643	+ 15 12 53.44	20.118
$\gamma$ Ursæ Majoris . . . . .	2.3	11 47 46.751	3.1837	+ 54 20 2.59	20.026
Groombr. 4163 . . . . . S. P.	7.0	11 49 14.893	+ 2.8611	+ 106 13 46.75	— 20.022
* $\pi$ Virginis . . . . .	4.3	11 54 58.775	3.0752	+ 7 15 20.06	20.088
$\sigma$ Virginis . . . . .	4.0	11 59 21.051	3.0577	+ 9 22 18.21	20.016
* $\epsilon$ Corvi . . . . .	3.0	12 4 12.756	3.0790	— 21 58 49.58	20.041
4 Draconis (H.) . . . . .	4.7	12 6 48.349	2.8913	+ 78 15 19.09	20.023
$\gamma$ Corvi . . . . .	2.0	12 9 53.570	+ 3.0791	— 16 54 12.11	— 20.019
* 2 Canum Venaticorum . . . . .	5.3	12 10 21.712	3.0231	+ 41 18 1.78	20.067
$\beta$ Chamæleonis . . . . .	5.0	12 11 37.299	3.3921	— 78 40 24.40	20.000
$\eta$ Virginis . . . . .	3.3	12 14 1.357	3.0685	— 0 1 39.70	20.044
* 6 Ursæ Minoris . . . . .	6.0	12 14 19.710	0.1110	+ 88 20 15.15	19.941
$\alpha^1$ Crucis . . . . .	1.0	12 20 11.741	+ 3.2745	— 62 27 41.96	— 20.017
* $\delta^2$ Corvi . . . . .	2.3	12 23 54.979	3.1020	— 15 52 29.58	20.087
* $\beta$ Canum Venaticorum . . . . .	4.3	12 28 16.817	2.8604	+ 41 58 56.77	19.618
$\beta$ Corvi . . . . .	2.3	12 28 20.841	3.1409	— 22 45 38.44	19.965
$\kappa$ Draconis . . . . .	3.3	12 28 34.261	2.5942	+ 70 25 19.90	19.893
* $\gamma$ Virginis ( <i>mean</i> ) . . . . .	2.7	12 35 50.020	+ 3.0381	— 0 49 7.32	— 19.815
21 Cassiopeæ . . . . . S. P.	6.0	12 38 3.948	3.8503	+ 105 38 26.70	19.757
* 31 Coronæ Borealis . . . . .	5.0	12 46 5.873	2.9306	+ 28 9 59.59	19.665
32 <sup>2</sup> Camelopardalis (H.) . . . . .	4.7	12 48 17.515	0.3832	+ 84 2 16.74	19.597
* $\gamma$ Cassiopeæ . . . . . S. P.	2.0	12 49 46.392	3.5758	+ 119 54 22.87	19.569
$\alpha$ Canum Venaticorum . . . . .	2.7	12 50 38.882	+ 2.8162	+ 38 56 22.50	— 19.517
* 43 Cephei (H.) . . . . . S. P.	4.3	12 53 12.157	7.1738	+ 94 21 37.53	19.515
* $\delta$ Muscæ . . . . .	4.0	12 54 22.463	4.0270	— 70 55 40.73	19.483
* $\epsilon$ Virginis . . . . .	2.7	12 56 27.163	2.9880	+ 11 34 38.72	19.422
$\theta$ Virginis . . . . .	4.3	13 3 59.745	3.1008	— 4 55 29.34	19.318
* 20 Canum Venaticorum . . . . .	4.7	13 12 23.113	+ 2.6973	+ 41 10 41.69	— 19.041
$\alpha$ Urs. Min. ( <i>Polaris</i> ) S. P.	2.0	13 16 36.670	22.4630	+ 91 18 16.18	18.944
$\alpha$ Virginis ( <i>Spica</i> ) . . . . .	1.0	13 19 8.099	3.1532	— 10 33 38.84	18.908
* $\kappa$ Octantis . . . . .	5.0	13 22 31.369	8.6016	— 85 11 43.70	18.798
38 Cassiopeæ . . . . . S. P.	6.3	13 22 41.054	+ 4.3713	+ 110 19 40.13	— 18.687

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MEAN PLACES FOR 1885.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.531, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
$\zeta$ Virginis . . . . .	3.3	<sup>h</sup> 13 <sup>m</sup> 28 <sup>s</sup> 50.010	+ 3.0538	— 0° 0' 27.31"	— 18.526
* B. A. C. 4536 . . . . .	5.0	13 29 39.656	+ 2.6827	+ 37 46 18.52	18.546
* $m$ Virginis . . . . .	6.0	13 35 34.602	+ 3.1427	— 8 7 20.25	18.298
$\eta$ Ursæ Majoris . . . . .	2.0	13 43 0.554	+ 2.3717	+ 49 53 14.86	18.086
$\eta$ Bootis . . . . .	3.0	13 49 12.554	+ 2.8568	+ 18 58 28.52	18.180
50 Cassiopeæ . . . . S. P.	4.0	13 53 37.804	+ 5.0027	+ 108 8 9.36	— 17.662
* $\theta$ Apodis . . . . .	5.0	13 54 9.492	+ 5.6617	— 76 14 25.50	17.610
$\beta$ Centauri . . . . .	1.0	13 55 42.772	+ 4.1741	— 59 49 3.33	17.604
* $\pi$ Hydræ . . . . .	3.7	13 59 49.543	+ 3.4068	— 26 7 40.90	17.515
$\alpha$ Dracogis . . . . .	3.3	14 1 16.612	+ 1.6235	+ 64 55 32.22	17.304
* $d$ Bootis . . . . .	5.0	14 5 9.279	+ 2.7388	+ 25 38 12.53	— 17.210
* $\kappa$ Virginis . . . . .	4.3	14 6 45.719	+ 3.1933	— 9 44 16.76	16.940
* $\delta$ Octantis . . . . .	5.0	14 8 36.556	+ 8.9325	— 83 8 21.22	16.986
* 4 Ursæ Minoris . . . . .	5.0	14 9 18.651	— 0.3296	+ 78 5 16.58	16.908
$\alpha$ Bootis ( <i>Arcturus</i> ) . . . . .	1.0	14 10 24.980	+ 2.7348	+ 19 46 53.54	18.893
* $\lambda$ Bootis . . . . .	4.0	14 12 0.695	+ 2.2830	+ 46 37 0.14	— 16.669
* $\lambda$ Virginis . . . . .	4.7	14 12 53.279	+ 3.2373	— 12 50 28.45	16.742
$\epsilon$ Cassiopeæ . . . . S. P.	4.0	14 19 35.852	+ 4.8564	+ 113 6 56.01	16.452
$\theta$ Bootis . . . . .	4.0	14 21 16.963	+ 2.0442	+ 52 22 57.33	16.770
$\rho$ Bootis . . . . .	3.7	14 26 52.486	+ 2.5878	+ 30 52 35.80	15.972
5 Ursæ Minoris . . . . .	4.7	14 27 46.761	— 0.1955	+ 76 12 25.90	— 16.011
$\alpha^2$ Centauri . . . . .	1.0	14 31 48.822	+ 4.0428	— 60 21 45.70	15.391
* $\alpha$ Apodis . . . . .	4.7	14 33 37.424	+ 7.1634	— 78 33 16.92	15.728
* 33 Bootis . . . . .	5.3	14 34 33.436	+ 2.2344	+ 44 54 4.00	15.721
$\epsilon$ Bootis . . . . .	2.3	14 39 57.936	+ 2.6214	+ 27 33 34.18	15.354
$\alpha^2$ Libræ . . . . .	2.3	14 44 31.016	+ 3.3089	— 15 33 47.66	— 15.183
* 47 Cephei (H.) . . . S. P.	6.0	14 50 50.265	+ 7.7017	+ 101 2 15.36	14.720
$\beta$ Ursæ Minoris . . . . .	2.0	14 51 2.991	— 0.2356	+ 74 37 31.64	14.718
* $\gamma$ Scorpii . . . . .	3.3	14 57 20.483	+ 3.5011	— 24 49 44.87	14.373
$\beta$ Bootis . . . . .	3.0	14 57 36.877	+ 2.2601	+ 40 50 40.43	14.372
48 Cephei (H.) . . . S. P.	6.3	15 5 45.698	+ 7.3911	+ 102 41 22.75	— 13.767
$\beta$ Libræ . . . . .	2.0	15 10 49.146	+ 3.2213	— 8 57 28.43	13.526
* $\delta$ Bootis . . . . .	3.0	15 10 52.022	+ 2.4208	+ 33 44 40.16	13.597
* $\rho$ Octantis . . . . .	6.0	15 16 56.119	+ 12.9164	— 84 4 42.02	13.049
$\mu^1$ Bootis . . . . .	4.0	15 20 8.787	+ 2.2662	+ 37 46 51.67	12.792
$\gamma^2$ Ursæ Minoris . . . . .	3.0	15 20 55.086	— 0.1369	+ 72 14 35.52	— 12.810
* $\beta$ Coronæ Borealis . . . . .	4.0	15 23 5.282	+ 2.4750	+ 29 30 9.13	12.608
$\alpha$ Coronæ Borealis . . . . .	2.0	15 29 49.159	+ 2.5392	+ 27 6 8.20	12.320
* $\gamma$ Camelop. (H.) . . . S. P.	4.3	15 38 13.944	+ 6.2313	+ 109 1 25.78	11.579
$\alpha$ Serpentis . . . . .	2.3	15 38 36.229	+ 2.9513	+ 6 47 17.02	11.568
$\epsilon$ Serpentis . . . . .	3.3	15 45 5.034	+ 2.9868	+ 4 49 28.77	— 11.067
$\zeta$ Ursæ Minoris . . . . .	4.3	15 48 11.218	— 2.2604	+ 78 8 51.81	10.909
$\epsilon$ Coronæ Borealis . . . . .	4.0	15 52 49.660	+ 2.4831	+ 27 12 41.33	10.626
$\delta$ Scorpii . . . . .	2.3	15 53 32.071	+ 3.5380	— 22 17 36.35	10.549
$\beta^1$ Scorpii . . . . .	2.0	15 58 45.069	+ 3.4802	— 19 29 23.18	10.160
* $\delta^1$ Apodis . . . . .	5.3	16 3 11.792	+ 8.7409	— 78 24 10.26	— 9.765
* $\varphi$ Herculis . . . . .	4.0	16 5 8.627	+ 1.8811	+ 45 14 12.68	9.593
Groombridge 2320 . . . . .	6.3	16 6 0.488	+ 0.1380	+ 68 6 47.63	9.499
$\delta$ Ophiuchi . . . . .	3.0	16 8 19.165	+ 3.1393	— 3 23 50.52	9.533
* $\sigma$ Coronæ Borealis ( <i>mean</i> ) . . . . .	5.7	16 10 22.269	+ 2.2446	+ 34 9 2.46	— 9.270

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MEAN PLACES FOR 1885.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.531, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
* γ Apodis . . . . .	4.3	16 15 50.440	+ 8.9962	— 78 38' 8.40	— 8.850
τ Herculis . . . . .	3.3	16 16 17.083	+ 1.8008	+ 46 35 15.21	8.746
* η Ursæ Minoris . . . .	5.0	16 20 52.566	— 1.9216	+ 76 1 11.76	8.151
α Scorpii ( <i>Antares</i> ) . . .	1.3	16 22 21.417	+ 3.6695	— 26 10 32.66	8.325
η Draconis . . . . .	2.7	16 22 26.225	+ 0.8055	+ 61 46 28.79	8.227
β Herculis . . . . .	2.3	16 25 16.589	+ 2.5773	+ 21 44 27.31	— 8.073
Α Draconis . . . . .	5.0	16 28 12.854	— 0.1368	+ 69 1 0.32	7.797
ζ Ophiuchi . . . . .	2.7	16 30 49.608	+ 3.2987	— 10 19 59.64	7.586
α Trianguli Australis . .	2.0	16 36 29.870	+ 6.9990	— 68 48 51.80	7.202
η Herculis . . . . .	3.3	16 38 57.196	+ 2.0536	+ 39 8 29.41	7.035
α Camelopardalis . S. P.	4.7	16 42 37.197	+ 5.9220	+ 113 51 16.45	— 6.641
κ Ophiuchi . . . . .	3.3	16 52 13.518	+ 2.8372	+ 9 33 16.75	5.850
δ Herculis . . . . .	5.0	16 57 21.628	+ 2.2111	+ 33 44 7.49	5.411
ε Ursæ Minoris . . . . .	4.3	16 57 47.298	— 6.3453	+ 82 13 29.14	5.379
* η Ophiuchi . . . . .	2.7	17 3 46.961	+ 3.4367	— 15 34 53.39	4.761
α <sup>1</sup> Herculis ( <i>var.</i> ) . . .	3.5	17 9 24.238	+ 2.7333	+ 14 31 19.92	— 4.365
π Herculis . . . . .	3.0	17 11 2.527	+ 2.0890	+ 36 56 21.46	4.243
* θ Ophiuchi . . . . .	3.3	17 14 56.825	+ 3.6788	— 24 53 1.13	3.968
δ Ophiuchi ( <i>var.</i> ) . . .	5.0	17 19 20.847	+ 3.6587	— 24 4 6.01	3.670
* δ Aræ . . . . .	4.0	17 20 43.288	+ 5.4003	— 60 35 10.70	3.561
Groombr. 966 . . S. P.	6.3	17 24 21.559	+ 7.9975	+ 105 2 5.77	— 3.125
* Groombr. 944 . . S. P.	6.3	17 25 15.140	+ 18.6250	+ 94 51 52.33	3.040
β Draconis . . . . .	2.7	17 27 50.104	+ 1.3531	+ 52 23 12.41	2.806
α Ophiuchi . . . . .	2.0	17 29 35.785	+ 2.7827	+ 12 38 40.34	2.890
* ε Herculis . . . . .	3.3	17 36 13.217	+ 1.6965	+ 46 4 4.54	2.089
ω Draconis . . . . .	5.0	17 37 37.572	— 0.3543	+ 68 48 39.46	— 1.631
μ Herculis . . . . .	3.3	17 41 57.507	+ 2.3462	+ 27 47 18.64	2.336
ψ <sup>1</sup> Draconis . . . . .	4.3	17 43 59.075	— 1.0799	+ 72 12 17.59	1.673
* θ Herculis . . . . .	4.0	17 52 18.534	+ 2.0550	+ 37 15 58.68	0.654
γ Draconis . . . . .	2.3	17 53 56.157	+ 1.3913	+ 51 30 9.74	0.560
γ <sup>3</sup> Sagittarii . . . . .	3.3	17 58 25.229	+ 3.8514	— 30 25 27.38	— 0.357
* ο Herculis . . . . .	4.0	18 3 3.409	+ 2.3393	+ 28 44 50.19	+ 0.270
22 Camelop. (H.) . . S. P.	4.7	18 6 10.115	+ 6.6178	+ 110 38 31.01	0.658
μ Sagittarii . . . . .	4.0	18 6 53.165	+ 3.5866	— 21 5 15.96	0.590
δ Ursæ Minoris . . . .	4.3	18 9 24.943	— 19.4535	+ 86 36 37.74	0.874
η Serpentis . . . . .	3.0	18 15 21.564	+ 3.1022	— 2 55 39.05	+ 0.669
* λ Sagittarii . . . . .	3.0	18 20 52.405	+ 3.7027	— 25 29 2.92	1.614
* χ Draconis . . . . .	4.0	18 23 7.733	— 1.0792	+ 72 40 57.27	1.644
ι Aquilæ . . . . .	4.3	18 28 56.949	+ 3.2645	— 8 19 24.88	2.196
* ζ Pavonis . . . . .	4.0	18 29 35.530	+ 7.0310	— 71 31 25.72	2.441
α Lyræ ( <i>Vega</i> ) . . . .	1.0	18 33 2.709	+ 2.0313	+ 38 40 37.55	+ 3.154
σ Octantis . . . . .	6.0	18 33 29.952	+ 107.2660	— 89 16 17.58	2.902
β Lyræ ( <i>var.</i> ) . . . .	4.0	18 45 50.066	+ 2.2142	+ 33 13 46.71	3.967
51 Cephei (H.) . . S. P.	5.3	18 46 15.674	+ 30.0105	+ 92 46 34.63	4.113
σ Sagittarii . . . . .	2.3	18 48 8.060	+ 3.7219	— 26 26 18.26	4.103
50 Draconis . . . . .	6.0	18 50 4.592	— 1.9056	+ 75 17 52.02	+ 4.421
* γ Lyræ . . . . .	3.3	18 54 38.524	+ 2.2443	+ 32 31 56.68	4.747
ζ Aquilæ . . . . .	3.0	19 0 7.481	+ 2.7569	+ 13 41 35.79	5.097
* ε Lyræ . . . . .	5.0	19 3 11.920	+ 2.1412	+ 35 55 13.58	5.469
* 25 Camelopardalis . S. P.	4.7	19 6 49.810	+ 12.9800	+ 97 22 14.35	+ 5.796

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Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>
<i>d</i> Sagittarii . . . .	5.0	19 10 54.364	+ 3.5126	— 19 9 23.46	+ 6.088
* <i>θ</i> Lyræ . . . . .	4.3	19 12 22.555	+ 2.0790	+ 37 55 45.54	6.229
<i>δ</i> Draconis . . . . .	3.0	19 12 31.590	+ 0.0306	+ 67 27 33.31	6.326
<i>τ</i> Draconis . . . . .	4.7	19 17 45.600	— 1.1143	+ 73 8 29.96	6.782
Piazzii vii. 67 . . . S. P.	6.0	19 18 54.487	+ 6.3024	+ 111 18 4.53	6.806
<i>δ</i> Aquilæ . . . . .	3.3	19 19 42.002	+ 3.0253	+ 2 53 10.69	+ 6.910
* <i>β</i> Cygni . . . . .	3.0	19 26 5.027	+ 2.4193	+ 27 43 7.40	7.348
<i>κ</i> Aquilæ . . . . .	5.0	19 30 42.259	+ 3.2291	— 7 16 55.97	7.732
* <i>β</i> Sagittæ . . . . .	4.3	19 35 53.039	+ 2.6955	+ 17 12 36.46	8.119
<i>λ</i> Ursæ Minoris . . . .	6.3	19 38 56.310	— 63.6095	+ 88 57 19.62	8.402
<i>γ</i> Aquilæ . . . . .	3.0	19 40 47.548	+ 2.8522	+ 10 20 1.41	+ 8.529
* <i>δ</i> Cygni . . . . .	2.7	19 41 22.869	+ 1.8761	+ 44 51 1.59	8.620
<i>α</i> Aquilæ ( <i>Altair</i> ) . . .	1.3	19 45 10.349	+ 2.9277	+ 8 33 55.09	9.253
* Groombr. 1374 . . . S. P.	5.7	19 46 24.549	+ 7.2940	+ 105 46 37.05	9.013
* <i>ε</i> Pavonis . . . . .	4.0	19 47 16.970	+ 7.0558	— 73 12 41.90	8.940
<i>ε</i> Draconis . . . . .	3.7	19 48 33.347	— 0.1773	+ 69 58 30.14	+ 9.175
<i>β</i> Aquilæ . . . . .	4.0	19 49 39.866	+ 2.9471	+ 6 7 12.70	8.742
* <i>γ</i> Sagittæ . . . . .	3.7	19 53 38.584	+ 2.6678	+ 19 10 49.74	9.579
* <i>c</i> Sagittarii . . . . .	5.0	19 55 35.088	+ 3.6956	— 28 1 42.81	9.709
<i>τ</i> Aquilæ . . . . .	6.0	19 58 31.364	+ 2.9332	+ 6 57 14.61	9.922
3 Ursæ Majoris (H.) S. P.	5.7	20 1 21.575	+ 6.0543	+ 111 11 20.70	+ 10.128
* <i>θ</i> Aquilæ . . . . .	3.0	20 5 22.235	+ 3.0974	— 1 9 42.96	10.440
* <i>ο</i> <sup>1</sup> Cygni . . . . .	4.3	20 10 0.639	+ 1.8893	+ 46 23 34.41	10.778
<i>α</i> <sup>3</sup> Capricorni . . . . .	3.0	20 11 40.420	+ 3.3326	— 12 54 1.65	10.898
<i>κ</i> Cephei ( <i>pr.</i> ) . . . . .	4.3	20 12 44.558	— 1.9158	+ 77 21 52.60	11.005
<i>α</i> Pavonis . . . . .	2.0	20 16 33.054	+ 4.7867	— 57 6 7.79	+ 11.163
<i>γ</i> Cygni . . . . .	2.3	20 18 6.169	+ 2.1536	+ 39 53 20.28	11.359
<i>π</i> Capricorni . . . . .	5.0	20 20 44.313	+ 3.4401	— 18 35 16.48	11.538
<i>ε</i> Delphini . . . . .	4.0	20 27 43.155	+ 2.8672	+ 10 54 47.27	12.027
Groombridge 3241 . . .	6.3	20 30 29.754	— 0.2169	+ 72 8 31.23	12.222
* <i>α</i> Delphini . . . . .	3.7	20 34 17.787	+ 2.7878	+ 15 30 24.77	+ 12.507
* <i>β</i> Pavonis . . . . .	3.0	20 34 35.070	+ 5.4792	— 66 36 53.29	12.501
<i>α</i> Cygni . . . . .	1.7	20 37 30.717	+ 2.0443	+ 44 52 10.99	12.714
* <i>ψ</i> Capricorni . . . . .	4.3	20 39 17.043	+ 3.5593	— 25 41 0.15	12.672
* <i>ε</i> Cygni . . . . .	2.7	20 41 33.501	+ 2.4274	+ 33 32 23.38	13.327
<i>μ</i> Aquarii . . . . .	4.7	20 46 27.055	+ 3.2402	— 9 24 51.08	+ 13.274
12 Year Cat. 1879 . . .	6.0	20 52 46.365	— 2.5351	+ 80 7 13.40	13.695
<i>ν</i> Cygni . . . . .	4.0	20 52 53.164	+ 2.2340	+ 40 43 29.23	13.714
<i>σ</i> <sup>3</sup> Ursæ Majoris . . . S. P.	5.0	21 0 15.725	+ 5.3608	+ 112 23 58.91	14.252
61 <sup>1</sup> Cygni . . . . .	5.0	21 1 44.547	+ 2.6830	+ 38 11 3.50	17.518
<i>ζ</i> Cygni . . . . .	3.0	21 8 2.497	+ 2.5494	+ 29 45 20.11	+ 14.601
* <i>τ</i> Cygni . . . . .	4.0	21 10 12.063	+ 2.3932	+ 37 33 17.45	15.253
<i>α</i> Cephei . . . . .	2.7	21 15 50.073	+ 1.4369	+ 62 5 54.61	15.167
1 Pegasi . . . . .	4.3	21 16 46.072	+ 2.7721	+ 19 18 46.52	15.230
* <i>ζ</i> Capricorni . . . . .	4.0	21 20 5.970	+ 3.4334	— 22 54 31.56	15.387
1 Draconis (H.) . . . S. P.	4.3	21 20 36.695	+ 9.0339	+ 98 10 0.89	+ 15.414
<i>d</i> Ursæ Majoris . . . S. P.	4.7	21 24 17.703	+ 5.4082	+ 109 39 54.91	15.540
<i>β</i> Aquarii . . . . .	3.0	21 25 30.290	+ 3.1621	— 6 4 35.71	15.650
<i>β</i> Cephei ( <i>pr.</i> ) . . . .	3.0	21 27 10.331	+ 0.7956	+ 70 3 21.30	15.753
<i>ξ</i> Aquarii . . . . .	5.0	21 31 37.801	+ 3.1983	— 8 22 9.92	+ 15.960

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1885.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.531, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
* 74 Cygni . . . . .	5.0	<sup>h</sup> 21 <sup>m</sup> 32 <sup>s</sup> 20.404	+ 2.4012	+ 39° 53' 49".40	+ 16.043
* λ <sup>1</sup> Octantis. . . . .	5.3	21 33 9.222	9.8369	— 83 14 46.27	15.995
ε Pegasi . . . . .	2.3	21 38 32.292	2.9467	+ 9 20 53.50	16.347
11 Cephei . . . . .	5.0	21 40 14.123	0.9027	+ 70 46 55.36	16.535
* π <sup>2</sup> Cygni . . . . .	4.3	21 42 32.715	2.2128	+ 48 46 40.05	16.536
μ Capricorni . . . . .	5.0	21 47 1.547	+ 3.2765	— 14 5 33.46	+ 16.769
* 16 Pegasi . . . . .	5.3	21 47 49.782	2.7276	+ 25 23 3.85	16.810
79 Draconis . . . . .	6.3	21 51 25.986	0.7313	+ 73 9 29.99	17.011
α Aquarii . . . . .	3.0	21 59 52.633	3.0829	— 0 52 41.31	17.348
α Gruis . . . . .	2.0	22 0 58.856	3.8083	— 47 31 1.93	17.236
* π Pegasi . . . . .	4.0	22 4 52.836	+ 2.6596	+ 32 36 51.46	+ 17.573
* υ Octantis . . . . .	6.0	22 9 18.718	13.3310	— 86 33 1.44	17.845
32 Ursæ Majoris . . S. P.	6.0	22 9 40.331	4.4258	+ 114 19 7.25	17.799
θ Aquarii . . . . .	4.3	22 10 45.905	3.1695	— 8 21 19.96	17.794
* γ Aquarii . . . . .	3.3	22 15 42.957	3.1010	— 1 57 59.53	18.032
π Aquarii . . . . .	4.7	22 19 24.254	+ 3.0648	+ 0 47 39.02	+ 18.148
* σ Aquarii . . . . .	5.0	22 24 33.573	3.1762	— 11 15 57.88	18.311
9 Draconis (H.) . . S. P.	4.7	22 25 17.924	5.2751	+ 103 41 42.94	18.381
* α Lacertæ . . . . .	4.0	22 26 33.264	2.4614	+ 49 41 29.12	18.410
η Aquarii . . . . .	4.0	22 29 26.813	3.0838	— 0 42 35.78	18.451
226 Cephei (B.) . . . .	5.3	22 30 15.146	+ 1.0789	+ 75 38 1.72	+ 18.526
* 10 Lacertæ . . . . .	5.0	22 34 6.104	2.6859	+ 38 27 6.91	18.664
* β Octantis . . . . .	4.7	22 34 13.999	6.5135	— 81 59 0.71	18.667
ζ Pegasi . . . . .	3.3	22 35 43.612	2.9908	+ 10 13 52.70	18.700
* λ Pegasi . . . . .	4.0	22 40 59.533	2.8848	+ 22 57 38.46	18.869
ι Cephei . . . . .	3.3	22 45 35.194	+ 2.1208	+ 65 35 44.27	+ 18.873
λ Aquarii . . . . .	4.0	22 46 36.906	3.1331	— 8 11 28.47	19.070
* Groombr. 1706 . . S. P.	6.0	22 50 43.464	4.9839	+ 101 36 50.65	19.172
α Pis. Aus. ( <i>Fomalhaut</i> )	1.3	22 51 17.656	3.3258	— 30 13 53.27	18.988
α Ursæ Majoris . . S. P.	2.0	22 56 37.395	3.7511	+ 117 37 42.20	19.358
* ο Andromedæ . . . .	3.7	22 56 37.849	+ 2.7490	+ 41 42 28.57	+ 19.283
α Pegasi ( <i>Markab</i> ) . .	2.0	22 59 1.971	2.9847	+ 14 35 11.93	19.297
* φ Aquarii . . . . .	4.3	23 8 22.014	3.1090	— 6 40 7.43	19.355
ο Cephei . . . . .	5.3	23 13 54.451	2.4421	+ 67 28 56.89	19.666
* τ Pegasi . . . . .	4.7	23 14 56.727	2.9630	+ 23 6 39.09	19.653
θ Piscium . . . . .	4.7	23 22 8.076	+ 3.0410	+ 5 44 50.23	+ 19.724
λ Draconis . . . . S. P.	3.3	23 24 33.880	3.6263	+ 110 2 3.68	19.835
* λ Andromedæ . . . .	4.0	23 31 56.258	2.9209	+ 45 50 5.63	19.470
ι Piscium . . . . .	4.3	23 34 2.134	3.0840	+ 5 0 10.98	19.482
γ Cephei . . . . .	3.3	23 34 37.895	2.4121	+ 76 59 25.60	20.074
* i <sup>1</sup> Aquarii . . . . .	5.0	23 38 14.214	+ 3.1174	— 18 54 54.25	+ 19.956
* δ Sculptoris . . . . .	4.3	23 42 56.114	3.1332	— 28 45 57.20	19.855
* γ <sup>1</sup> Octantis . . . . .	5.3	23 45 18.884	3.7045	— 82 39 28.55	19.091
Groombridge 4163 . . .	7.0	23 49 14.893	2.8611	+ 73 46 13.25	20.022
ω Piscium . . . . .	4.0	23 53 24.380	3.0782	+ 6 13 35.77	19.931
* 33 Piscium . . . . .	5.0	23 59 26.957	+ 3.0709	— 6 21 3.05	+ 20.144

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Jan.	<sup>h</sup> 1 <sup>m</sup> 16	+88° 42'	Jan.	<sup>h</sup> 6 <sup>m</sup> 46	+87° 13'	Jan.	<sup>h</sup> 18 <sup>m</sup> 9	+86° 36'	Jan.	<sup>h</sup> 19 <sup>m</sup> 37	+88° 57'
0.3	<sup>s</sup> 75.06	" 2.0	0.5	<sup>s</sup> 43.12	" 14.9	1.0	<sup>s</sup> 1.26	" 44.6	1.1	<sup>s</sup> 54.07	" 34.0
1.3	74.13	2.1	1.5	43.27	15.2	2.0	1.23	44.2	2.1	53.48	33.7
2.3	73.15	2.3	2.5	43.40	15.6	3.0	1.22	43.8	3.1	52.94	33.4
3.3	72.13	2.4	3.5	43.49	15.9	4.0	1.23	43.4	4.0	52.47	33.1
4.3	71.08	2.5	4.5	43.56	16.3	5.0	1.26	43.1	5.0	52.09	32.7
5.3	70.04	2.6	5.5	43.59	16.6	6.0	1.31	42.7	6.0	51.80	32.4
6.3	69.02	2.6	6.5	43.59	17.0	7.0	1.40	42.4	7.0	51.58	32.0
7.2	68.04	2.6	7.5	43.57	17.3	8.0	1.49	42.0	8.0	51.39	31.7
8.2	67.13	2.6	8.5	43.55	17.6	9.0	1.58	41.7	9.0	51.21	31.4
9.2	66.25	2.7	9.5	43.53	17.9	9.9	1.65	41.4	10.0	51.02	31.1
10.2	65.38	2.7	10.5	43.53	18.2	10.9	1.72	41.1	11.0	50.80	30.8
11.2	64.52	2.7	11.5	43.54	18.5	11.9	1.78	40.8	12.0	50.56	30.5
12.2	63.68	2.8	12.5	43.56	18.8	12.9	1.84	40.5	13.0	50.29	30.2
13.2	62.82	2.8	13.5	43.58	19.1	13.9	1.91	40.2	14.0	50.01	29.9
14.2	61.89	2.8	14.4	43.60	19.4	14.9	1.99	39.9	15.0	49.74	29.6
15.2	60.90	2.9	15.4	43.61	19.7	15.9	2.08	39.5	16.0	49.51	29.2
16.2	59.86	2.9	16.4	43.59	20.1	16.9	2.20	39.2	17.0	49.35	28.9
17.2	58.79	2.9	17.4	43.53	20.4	17.9	2.32	38.8	18.0	49.26	28.5
18.2	57.71	2.9	18.4	43.45	20.8	18.9	2.47	38.5	19.0	49.25	28.1
19.2	56.64	2.9	19.4	43.34	21.2	19.9	2.65	38.1	20.0	49.32	27.8
20.2	55.61	2.8	20.4	43.20	21.5	20.9	2.83	37.8	21.0	49.44	27.4
21.2	54.64	2.8	21.4	43.06	21.8	21.9	3.00	37.5	22.0	49.60	27.1
22.2	53.74	2.7	22.4	42.91	22.1	22.9	3.18	37.3	23.0	49.75	26.8
23.2	52.89	2.6	23.4	42.78	22.4	23.9	3.35	37.0	24.0	49.87	26.5
24.2	52.07	2.6	24.4	42.67	22.6	24.9	3.50	36.7	25.0	49.96	26.2
25.2	51.25	2.5	25.4	42.57	22.9	25.9	3.64	36.5	26.0	50.01	25.9
26.2	50.42	2.5	26.4	42.49	23.2	26.9	3.79	36.2	27.0	50.03	25.6
27.2	49.56	2.5	27.4	42.41	23.5	27.9	3.94	35.9	28.0	50.04	25.3
28.2	48.65	2.4	28.4	42.33	23.8	28.9	4.09	35.6	29.0	50.07	25.0
29.2	47.69	2.4	29.4	42.22	24.1	29.9	4.27	35.3	30.0	50.16	24.6
30.2	46.69	2.3	30.4	42.09	24.4	30.9	4.46	35.0	31.0	50.32	24.3
31.2	45.67	2.3	31.4	41.92	24.7	31.9	4.69	34.6	32.0	50.55	23.9
32.2	44.65	2.1	32.4	41.72	25.1	32.9	4.94	34.3			



## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Feb.	<sup>h</sup> 1 <sup>m</sup> 16	+88° 41'	Feb.	<sup>h</sup> 6 <sup>m</sup> 46	+87° 13'	Feb.	<sup>h</sup> 18 <sup>m</sup> 9	+86° 36'	Feb.	<sup>h</sup> 19 <sup>m</sup> 37	+88° 57'
	<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>
1.2	44.65	62.1	1.4	41.72	25.1	1.9	4.94	34.3	1.0	50.55	23.9
2.2	43.66	62.0	2.4	41.48	25.4	2.9	5.19	34.0	2.0	50.87	23.6
3.2	42.70	61.9	3.4	41.23	25.6	3.9	5.45	33.8	3.0	51.27	23.2
4.2	41.81	61.7	4.4	40.97	25.9	4.9	5.72	33.6	4.0	51.72	22.9
5.2	40.99	61.6	5.4	40.70	26.2	5.9	5.98	33.4	5.0	52.19	22.6
6.2	40.22	61.4	6.4	40.45	26.4	6.9	6.23	33.1	6.0	52.65	22.3
7.2	39.47	61.3	7.4	40.21	26.6	7.9	6.46	32.9	7.0	53.10	22.0
8.2	38.71	61.1	8.4	40.00	26.9	8.9	6.70	32.7	8.0	53.52	21.8
9.2	37.95	61.0	9.4	39.79	27.1	9.9	6.94	32.5	8.9	53.91	21.5
10.2	37.15	60.9	10.4	39.58	27.4	10.9	7.18	32.2	9.9	54.28	21.2
11.2	36.31	60.7	11.4	39.35	27.7	11.9	7.44	32.0	10.9	54.64	20.9
12.2	35.43	60.6	12.4	39.11	27.9	12.9	7.70	31.7	11.9	55.03	20.6
13.2	34.51	60.4	13.4	38.86	28.2	13.9	7.99	31.5	12.9	55.47	20.3
14.1	33.59	60.3	14.4	38.57	28.5	14.9	8.29	31.2	13.9	55.98	19.9
15.1	32.68	60.1	15.4	38.24	28.8	15.8	8.61	31.0	14.9	56.57	19.6
16.1	31.82	59.8	16.4	37.89	29.0	16.8	8.96	30.8	15.9	57.24	19.3
17.1	31.02	59.6	17.4	37.53	29.3	17.8	9.29	30.6	16.9	57.97	19.0
18.1	30.27	59.4	18.4	37.17	29.5	18.8	9.62	30.4	17.9	58.74	18.7
19.1	29.59	59.2	19.4	36.83	29.7	19.8	9.94	30.3	18.9	59.50	18.4
20.1	28.97	58.9	20.4	36.49	29.9	20.8	10.24	30.1	19.9	60.25	18.2
21.1	28.37	58.7	21.4	36.18	30.0	21.8	10.54	30.0	20.9	60.97	18.0
22.1	27.78	58.5	22.3	35.89	30.2	22.8	10.83	29.8	21.9	61.63	17.7
23.1	27.17	58.3	23.3	35.61	30.4	23.8	11.12	29.6	22.9	62.26	17.5
24.1	26.54	58.1	24.3	35.33	30.6	24.8	11.40	29.5	23.9	62.86	17.3
25.1	25.85	58.0	25.3	35.04	30.8	25.8	11.70	29.3	24.9	63.46	17.0
26.1	25.12	57.8	26.3	34.72	31.0	26.8	12.02	29.1	25.9	64.10	16.8
27.1	24.37	57.5	27.3	34.38	31.2	27.8	12.36	28.9	26.9	64.80	16.5
28.1	23.62	57.3	28.3	34.00	31.5	28.8	12.72	28.8	27.9	65.57	16.2
29.1	22.90	57.0	29.3	33.60	31.7	29.8	13.08	28.6	28.9	66.42	16.0
									29.9	67.34	15.7

CIRCUMPOLAR STARS.											
APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.											
Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\beta$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Mar.	<sup>h</sup> <sup>m</sup> 1 16	+88° 41'	Mar.	<sup>h</sup> <sup>m</sup> 6 46	+87° 13'	Mar.	<sup>h</sup> <sup>m</sup> 18 9	+86° 36'	Mar.	<sup>h</sup> <sup>m</sup> 19 38	+88° 57'
	<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>
1.1	22.90	57.0	1.3	33.60	31.7	1.8	13.08	28.6	1.9	7.34	15.7
2.1	22.24	56.7	2.3	33.17	31.8	2.8	13.46	28.5	2.9	8.32	15.4
3.1	21.63	56.5	3.3	32.74	32.0	3.8	13.85	28.4	3.9	9.33	15.2
4.1	21.10	56.1	4.3	32.30	32.1	4.8	14.22	28.3	4.9	10.33	15.0
5.1	20.62	55.9	5.3	31.87	32.2	5.8	14.58	28.3	5.9	11.31	14.9
6.1	20.18	55.6	6.3	31.47	32.4	6.8	14.93	28.2	6.9	12.25	14.7
7.1	19.77	55.3	7.3	31.09	32.5	7.8	15.27	28.2	7.9	13.15	14.5
8.1	19.36	55.1	8.3	30.72	32.6	8.8	15.60	28.1	8.9	14.02	14.4
9.1	18.93	54.8	9.3	30.36	32.7	9.8	15.93	28.0	9.9	14.88	14.2
10.1	18.46	54.5	10.3	29.99	32.8	10.8	16.27	27.9	10.9	15.74	14.0
11.1	17.95	54.3	11.3	29.62	33.0	11.8	16.62	27.8	11.9	16.63	13.8
12.1	17.42	54.0	12.3	29.23	33.1	12.8	16.97	27.7	12.9	17.59	13.6
13.1	16.88	53.8	13.3	28.80	33.2	13.8	17.34	27.6	13.9	18.61	13.4
14.1	16.35	53.5	14.3	28.36	33.4	14.8	17.74	27.6	14.9	19.70	13.2
15.1	15.86	53.1	15.3	27.89	33.5	15.8	18.14	27.5	15.9	20.84	13.0
16.1	15.42	52.8	16.3	27.41	33.6	16.8	18.55	27.5	16.9	22.02	12.8
17.1	15.05	52.5	17.3	26.93	33.7	17.8	18.94	27.5	17.8	23.21	12.7
18.1	14.76	52.1	18.3	26.46	33.7	18.8	19.32	27.5	18.8	24.38	12.6
19.1	14.53	51.8	19.3	26.01	33.8	19.8	19.69	27.5	19.8	25.51	12.5
20.0	14.35	51.5	20.3	25.58	33.8	20.8	20.04	27.5	20.8	26.59	12.4
21.0	14.19	51.2	21.3	25.18	33.8	21.8	20.38	27.6	21.8	27.60	12.3
22.0	14.03	50.9	22.3	24.80	33.8	22.8	20.71	27.6	22.8	28.58	12.2
23.0	13.84	50.7	23.3	24.44	33.9	23.8	21.04	27.6	23.8	29.54	12.1
24.0	13.60	50.4	24.3	24.07	33.9	24.7	21.37	27.6	24.8	30.50	12.0
25.0	13.33	50.1	25.3	23.68	34.0	25.7	21.71	27.6	25.8	31.50	11.8
26.0	13.05	49.8	26.3	23.27	34.0	26.7	22.07	27.6	26.8	32.55	11.7
27.0	12.76	49.5	27.3	22.84	34.1	27.7	22.45	27.5	27.8	33.68	11.6
28.0	12.48	49.2	28.3	22.37	34.2	28.7	22.84	27.6	28.8	34.87	11.5
29.0	12.25	48.9	29.3	21.89	34.2	29.7	23.23	27.6	29.8	36.11	11.4
30.0	12.08	48.5	30.3	21.40	34.2	30.7	23.63	27.7	30.8	37.38	11.3
31.0	11.99	48.2	31.2	20.91	34.2	31.7	24.02	27.8	31.8	38.66	11.2
32.0	11.96	47.8	32.2	20.43	34.1	32.7	24.40	27.9	32.8	39.91	11.2

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

$\alpha$ Ursæ Minoris. (Polaris.)			51 Cephei (Hæv.)			$\delta$ Ursæ Minoris.			$\lambda$ Ursæ Minoris.		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Apr.	<sup>h</sup> 1 <sup>m</sup> 16	+88° 41'	Apr.	<sup>h</sup> 6 <sup>m</sup> 46	+87° 13'	Apr.	<sup>h</sup> 18 <sup>m</sup> 9	+86° 36'	Apr.	<sup>h</sup> 19 <sup>m</sup> 38	+88° 57'
1.0	<sup>s</sup> 11.96	47.8	1.9	<sup>s</sup> 20.43	34.1	1.7	<sup>s</sup> 24.40	27.9	1.8	<sup>s</sup> 39.91	11.2
2.0	11.98	47.5	2.2	19.97	34.1	2.7	24.76	28.0	2.8	41.11	11.2
3.0	12.04	47.2	3.3	19.53	34.0	3.7	25.10	28.1	3.8	42.25	11.2
4.0	12.12	46.8	4.2	19.13	34.0	4.7	25.43	28.2	4.8	43.35	11.2
5.0	12.18	46.5	5.3	18.74	33.9	5.7	25.74	28.3	5.8	44.41	11.2
6.0	12.21	46.3	6.2	18.35	33.9	6.7	26.06	28.4	6.8	45.45	11.2
7.0	12.21	46.0	7.2	17.96	33.8	7.7	26.38	28.4	7.8	46.50	11.1
8.0	12.17	45.7	8.2	17.56	33.8	8.7	26.73	28.5	8.8	47.60	11.0
9.0	12.11	45.4	9.3	17.14	33.8	9.7	27.09	28.6	9.8	48.76	11.0
10.0	12.07	45.1	10.2	16.70	33.8	10.7	27.45	28.7	10.8	49.97	10.9
11.0	12.04	44.7	11.2	16.25	33.7	11.7	27.82	28.8	11.8	51.23	10.9
12.0	12.07	44.4	12.2	15.78	33.7	12.7	28.18	28.9	12.8	52.53	10.9
13.0	12.17	44.0	13.2	15.31	33.6	13.7	28.55	29.0	13.8	53.83	10.9
14.0	12.34	43.7	14.2	14.85	33.5	14.7	28.90	29.2	14.8	55.11	11.0
15.0	12.58	43.4	15.2	14.42	33.4	15.7	29.22	29.4	15.8	56.33	11.0
16.0	12.87	43.0	16.2	14.01	33.2	16.7	29.53	29.6	16.8	57.50	11.1
17.0	13.20	42.7	17.2	13.63	33.1	17.7	29.82	29.8	17.8	58.60	11.2
18.0	13.53	42.4	18.2	13.27	33.0	18.7	30.10	30.0	18.8	59.64	11.3
19.0	13.84	42.2	19.2	12.93	32.8	19.7	30.37	30.1	19.8	60.63	11.3
20.0	14.12	41.9	20.2	12.61	32.7	20.7	30.64	30.3	20.8	61.61	11.4
21.0	14.35	41.6	21.2	12.28	32.6	21.7	30.91	30.4	21.8	62.61	11.4
22.0	14.56	41.4	22.2	11.93	32.5	22.7	31.19	30.6	22.7	63.65	11.5
23.0	14.76	41.1	23.2	11.55	32.4	23.7	31.48	30.7	23.7	64.75	11.5
24.0	14.96	40.8	24.2	11.16	32.3	24.7	31.79	30.9	24.7	65.90	11.6
24.9	15.19	40.5	25.2	10.76	32.2	25.7	32.11	31.1	25.7	67.09	11.6
25.9	15.47	40.2	26.2	10.34	32.1	26.7	32.42	31.3	26.7	68.30	11.7
26.9	15.82	39.9	27.2	9.92	31.9	27.7	32.73	31.5	27.7	69.51	11.8
27.9	16.25	39.5	28.2	9.51	31.7	28.7	33.02	31.8	28.7	70.70	11.9
28.9	16.73	39.2	29.2	9.12	31.5	29.6	33.30	32.0	29.7	71.84	12.1
29.9	17.25	38.9	30.2	8.77	31.3	30.6	33.55	32.3	30.7	72.93	12.2
30.9	17.79	38.7	31.2	8.44	31.1	31.6	33.79	32.6	31.7	73.95	12.4
31.9	18.32	38.4									

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
May	<sup>h</sup> 1 <sup>m</sup> 16	+88° 41'	May	<sup>h</sup> 6 <sup>m</sup> 46	+87° 13'	May	<sup>h</sup> 18 <sup>m</sup> 9	+86° 36'	May	<sup>h</sup> 19 <sup>m</sup> 39	+88° 57'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.9	18.32	38.4	1.2	8.44	31.1	1.6	33.79	32.6	1.7	13.95	12.4
2.9	18.63	38.2	2.2	8.14	30.9	2.6	34.02	32.8	2.7	14.91	12.5
3.9	19.30	37.9	3.2	7.85	30.7	3.6	34.23	33.0	3.7	15.84	12.7
4.9	19.74	37.7	4.2	7.56	30.5	4.6	34.44	33.2	4.7	16.76	12.8
5.9	20.14	37.4	5.2	7.27	30.3	5.6	34.66	33.4	5.7	17.70	12.9
6.9	20.52	37.2	6.2	6.97	30.2	6.6	34.90	33.6	6.7	18.67	13.0
7.9	20.92	36.9	7.1	6.65	30.0	7.6	35.15	33.9	7.7	19.69	13.1
8.9	21.37	36.7	8.1	6.32	29.9	8.6	35.40	34.1	8.7	20.75	13.3
9.9	21.88	36.4	9.1	5.96	29.7	9.6	35.66	34.3	9.7	21.85	13.4
10.9	22.45	36.1	10.1	5.61	29.5	10.6	35.90	34.6	10.7	22.95	13.6
11.9	23.10	35.8	11.1	5.27	29.2	11.6	36.13	34.9	11.7	24.04	13.7
12.9	23.80	35.6	12.1	4.94	29.0	12.6	36.35	35.2	12.7	25.08	13.9
13.9	24.53	35.4	13.1	4.65	28.7	13.6	36.54	35.5	13.7	26.05	14.2
14.9	25.27	35.1	14.1	4.38	28.4	14.6	36.70	35.8	14.7	26.95	14.4
15.9	26.00	35.0	15.1	4.16	28.2	15.6	36.85	36.1	15.7	27.77	14.6
16.9	26.70	34.8	16.1	3.96	27.9	16.6	36.98	36.4	16.7	28.52	14.9
17.9	27.36	34.6	17.1	3.78	27.7	17.6	37.11	36.6	17.7	29.23	15.1
18.9	27.98	34.4	18.1	3.60	27.4	18.6	37.25	36.9	18.7	29.94	15.3
19.9	28.57	34.3	19.1	3.41	27.2	19.6	37.39	37.1	19.7	30.68	15.4
20.9	29.15	34.1	20.1	3.20	27.0	20.6	37.54	37.4	20.7	31.46	15.6
21.9	29.75	33.9	21.1	2.97	26.8	21.6	37.70	37.7	21.7	32.29	15.8
22.9	30.39	33.6	22.1	2.73	26.6	22.6	37.87	37.9	22.7	33.16	16.0
23.9	31.08	33.4	23.1	2.47	26.3	23.6	38.04	38.2	23.7	34.06	16.2
24.9	31.84	33.2	24.1	2.21	26.0	24.6	38.20	38.5	24.7	34.95	16.4
25.9	32.67	33.0	25.1	1.97	25.8	25.6	38.35	38.9	25.7	35.82	16.7
26.9	33.53	32.8	26.1	1.74	25.5	26.6	38.48	39.2	26.7	36.64	17.0
27.9	34.41	32.6	27.1	1.55	25.1	27.6	38.58	39.5	27.7	37.40	17.2
28.9	35.29	32.5	28.1	1.38	24.8	28.6	38.66	39.9	28.7	38.09	17.5
29.9	36.16	32.4	29.1	1.25	24.5	29.6	38.74	40.2	29.6	38.71	17.8
30.9	36.99	32.2	30.1	1.13	24.2	30.6	38.80	40.5	30.6	39.28	18.1
31.9	37.76	32.1	31.1	1.02	24.0	31.6	38.86	40.8	31.6	39.82	18.3
32.6	38.48	32.0	32.1	0.92	23.7	32.6	38.93	41.1	32.6	40.36	18.6

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
June	<sup>h</sup> 1 <sup>m</sup> 16	+88° 41'	June	<sup>h</sup> 6 <sup>m</sup> 45	+87° 13'	June	<sup>h</sup> 18 <sup>m</sup> 9	+86° 36'	June	<sup>h</sup> 19 <sup>m</sup> 39	+88° 57'
1.8	<sup>s</sup> 38.48	32.0	1.1	<sup>s</sup> 60.92	23.7	1.6	<sup>s</sup> 38.93	41.1	1.6	<sup>s</sup> 40.36	18.6
2.8	39.19	31.9	2.1	60.81	23.4	2.6	39.00	41.4	2.6	40.93	18.8
3.8	39.90	31.7	3.1	60.68	23.2	3.6	39.07	41.7	3.6	41.54	19.0
4.8	40.63	31.6	4.1	60.54	22.9	4.6	39.15	41.9	4.6	42.18	19.2
5.8	41.40	31.4	5.1	60.38	22.7	5.6	39.24	42.2	5.6	42.85	19.5
6.8	42.23	31.3	6.1	60.22	22.4	6.6	39.33	42.6	6.6	43.53	19.7
7.8	43.14	31.1	7.1	60.07	22.1	7.6	39.40	42.9	7.6	44.20	20.0
8.8	44.10	31.0	8.1	59.93	21.8	8.6	39.44	43.3	8.6	44.83	20.3
9.8	45.09	30.9	9.1	59.83	21.4	9.6	39.47	43.6	9.6	45.39	20.6
10.8	46.09	30.8	10.1	59.75	21.1	10.6	39.48	44.0	10.6	45.87	21.0
11.8	47.08	30.8	11.1	59.72	20.7	11.6	39.47	44.3	11.6	46.28	21.3
12.8	48.04	30.7	12.0	59.71	20.4	12.6	39.44	44.7	12.6	46.61	21.6
13.8	48.96	30.7	13.0	59.72	20.1	13.6	39.40	45.0	13.6	46.88	21.9
14.8	49.83	30.6	14.0	59.74	19.8	14.6	39.35	45.3	14.6	47.13	22.2
15.8	50.65	30.6	15.0	59.75	19.5	15.6	39.31	45.6	15.6	47.39	22.5
16.8	51.45	30.6	16.0	59.75	19.2	16.6	39.28	45.9	16.6	47.68	22.8
17.8	52.25	30.5	17.0	59.74	19.0	17.6	39.26	46.1	17.6	48.01	23.0
18.8	53.08	30.4	18.0	59.71	18.7	18.6	39.26	46.4	18.6	48.39	23.3
19.8	53.96	30.4	19.0	59.67	18.4	19.6	39.25	46.7	19.6	48.80	23.6
20.8	54.89	30.3	20.0	59.62	18.1	20.6	39.24	47.1	20.6	49.21	23.9
21.8	55.87	30.2	21.0	59.57	17.8	21.6	39.23	47.4	21.6	49.59	24.2
22.8	56.90	30.1	22.0	59.55	17.4	22.6	39.20	47.8	22.6	49.93	24.6
23.8	57.95	30.1	23.0	59.55	17.1	23.6	39.13	48.1	23.6	50.22	24.9
24.8	59.00	30.1	24.0	59.57	16.8	24.6	39.04	48.5	24.6	50.43	25.3
25.8	60.03	30.1	25.0	59.63	16.4	25.6	38.95	48.8	25.6	50.57	25.6
26.8	61.02	30.1	26.0	59.71	16.1	26.6	38.84	49.1	26.6	50.65	26.0
27.8	61.96	30.1	27.0	59.82	15.8	27.6	38.72	49.5	27.6	50.69	26.3
28.8	62.85	30.2	28.0	59.93	15.5	28.6	38.60	49.8	28.6	50.71	26.6
29.8	63.69	30.2	29.0	60.03	15.2	29.6	38.49	50.0	29.6	50.74	26.9
30.8	64.51	30.2	30.0	60.12	14.9	30.6	38.39	50.3	30.6	50.80	27.2
31.8	65.34	30.2	31.0	60.20	14.6	31.6	38.30	50.6	31.6	50.90	27.5

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
July	<sup>h</sup> 1 <sup>m</sup> 17	+88° 41'	July	<sup>h</sup> 6 <sup>m</sup> 46	+87° 13'	July	<sup>h</sup> 18 <sup>m</sup> 9	+86° 36'	July	<sup>h</sup> 19 <sup>m</sup> 39	+88° 57'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.8	5.34	30.2	1.0	0.20	14.6	1.5	38.30	50.6	1.6	50.90	27.5
2.8	6.20	30.2	2.0	0.26	14.4	2.5	38.21	50.9	2.5	51.03	27.8
3.8	7.12	30.2	3.0	0.31	14.1	3.5	38.13	51.2	3.5	51.18	28.1
4.8	8.10	30.2	4.0	0.36	13.8	4.5	38.03	51.5	4.5	51.33	28.4
5.8	9.13	30.2	5.0	0.43	13.4	5.5	37.91	51.8	5.5	51.45	28.8
6.8	10.19	30.3	6.0	0.51	13.1	6.5	37.79	52.2	6.5	51.50	29.1
7.7	11.27	30.3	7.0	0.63	12.8	7.5	37.63	52.5	7.5	51.48	29.5
8.7	12.34	30.4	8.0	0.78	12.4	8.5	37.44	52.9	8.5	51.38	29.9
9.7	13.38	30.5	9.0	0.97	12.1	9.5	37.24	53.2	9.5	51.20	30.2
10.7	14.38	30.6	10.0	1.18	11.7	10.5	37.04	53.5	10.5	50.94	30.6
11.7	15.32	30.7	11.0	1.42	11.4	11.5	36.83	53.8	11.5	50.64	30.9
12.7	16.21	30.8	12.0	1.64	11.1	12.4	36.63	54.0	12.5	50.35	31.2
13.7	17.06	30.9	13.0	1.85	10.9	13.4	36.43	54.3	13.5	50.08	31.5
14.7	17.89	31.0	14.0	2.05	10.6	14.4	36.24	54.5	14.5	49.85	31.8
15.7	18.73	31.1	15.0	2.23	10.4	15.4	36.06	54.8	15.5	49.66	32.1
16.7	19.61	31.2	16.0	2.40	10.1	16.4	35.89	55.0	16.5	49.50	32.4
17.7	20.53	31.3	17.0	2.56	9.8	17.4	35.72	55.3	17.5	49.36	32.7
18.7	21.50	31.3	17.9	2.72	9.5	18.4	35.54	55.6	18.5	49.22	33.1
19.7	22.52	31.4	18.9	2.89	9.2	19.4	35.35	55.9	19.5	49.04	33.4
20.7	23.56	31.5	19.9	3.07	8.8	20.4	35.14	56.2	20.5	48.80	33.8
21.7	24.60	31.7	20.9	3.30	8.5	21.4	34.91	56.6	21.5	48.49	34.1
22.7	25.62	31.8	21.9	3.55	8.2	22.4	34.65	56.9	22.5	48.11	34.5
23.7	26.61	32.0	22.9	3.83	7.9	23.4	34.39	57.2	23.5	47.66	34.9
24.7	27.53	32.2	23.9	4.12	7.6	24.4	34.11	57.4	24.5	47.16	35.2
25.7	28.39	32.3	24.9	4.42	7.3	25.4	33.84	57.7	25.5	46.63	35.5
26.7	29.21	32.5	25.9	4.73	7.0	26.4	33.57	57.9	26.5	46.11	35.8
27.7	30.00	32.7	26.9	5.02	6.8	27.4	33.31	58.1	27.5	45.62	36.1
28.7	30.78	32.8	27.9	5.29	6.6	28.4	33.06	58.3	28.5	45.16	36.4
29.7	31.57	33.0	28.9	5.55	6.3	29.4	32.82	58.5	29.5	44.74	36.7
30.7	32.40	33.1	29.9	5.79	6.1	30.4	32.59	58.8	30.5	44.35	36.9
31.7	33.28	33.2	30.9	6.04	5.8	31.4	32.35	59.0	31.5	43.97	37.2
32.7	34.21	33.4	31.9	6.29	5.5	32.4	32.09	59.3	32.5	43.57	37.6
			32.9	6.56	5.3						

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.
Aug.	<sup>h</sup> <sup>m</sup> 1 17	+88° 41'	Aug.	<sup>h</sup> <sup>m</sup> 6 46	+87° 12'	Aug.	<sup>h</sup> <sup>m</sup> 18 9	+86° 36'	Aug.	<sup>h</sup> <sup>m</sup> 19 39	+88° 57'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.7	34.21	33.4	1.9	6.56	65.3	1.4	32.09	59.3	1.5	43.57	37.6
2.7	35.17	33.6	2.9	6.86	65.0	2.4	31.81	59.5	2.5	43.13	37.9
3.7	36.15	33.7	3.9	7.18	64.6	3.4	31.52	59.8	3.5	42.62	38.3
4.7	37.13	33.9	4.9	7.54	64.3	4.4	31.20	60.1	4.5	42.01	38.6
5.7	38.09	34.2	5.9	7.93	64.1	5.4	30.87	60.3	5.5	41.32	38.9
6.7	39.00	34.4	6.9	8.34	63.8	6.4	30.52	60.6	6.5	40.58	39.3
7.7	39.85	34.7	7.9	8.74	63.6	7.4	30.17	60.8	7.5	39.79	39.6
8.7	40.64	34.9	8.9	9.14	63.4	8.4	29.81	61.0	8.5	38.98	39.9
9.7	41.38	35.2	9.9	9.53	63.1	9.4	29.47	61.2	9.5	38.18	40.2
10.7	42.09	35.4	10.9	9.90	62.9	10.4	29.14	61.3	10.4	37.42	40.4
11.7	42.80	35.6	11.9	10.23	62.7	11.4	28.84	61.5	11.4	36.70	40.7
12.6	43.52	35.8	12.9	10.55	62.5	12.4	28.54	61.7	12.4	36.03	41.0
13.6	44.28	36.0	13.9	10.88	62.3	13.4	28.23	61.8	13.4	35.38	41.2
14.6	45.08	36.2	14.9	11.22	62.0	14.4	27.92	62.0	14.4	34.73	41.5
15.6	45.92	36.4	15.9	11.57	61.8	15.4	27.61	62.3	15.4	34.07	41.8
16.6	46.80	36.6	16.9	11.94	61.5	16.4	27.28	62.5	16.4	33.37	42.2
17.6	47.68	36.9	17.9	12.34	61.3	17.3	26.93	62.7	17.4	32.60	42.5
18.6	48.55	37.2	18.9	12.76	61.0	18.3	26.55	62.9	18.4	31.75	42.8
19.6	49.38	37.5	19.9	13.21	60.8	19.3	26.17	63.1	19.4	30.84	43.1
20.6	50.16	37.7	20.9	13.67	60.6	20.3	25.79	63.3	20.4	29.88	43.4
21.6	50.96	38.0	21.8	14.12	60.4	21.3	25.40	63.4	21.4	28.89	43.7
22.6	51.51	38.3	22.8	14.57	60.2	22.3	25.01	63.6	22.4	27.89	43.9
23.6	52.12	38.6	23.8	15.00	60.1	23.3	24.64	63.7	23.4	26.91	44.2
24.6	52.70	38.9	24.8	15.40	59.9	24.3	24.28	63.8	24.4	25.97	44.4
25.6	53.27	39.2	25.8	15.80	59.8	25.3	23.93	63.9	25.4	25.08	44.6
26.6	53.87	39.4	26.8	16.19	59.6	26.3	23.58	64.0	26.4	24.23	44.8
27.6	54.52	39.7	27.8	16.57	59.4	27.3	23.24	64.2	27.4	23.39	45.1
28.6	55.21	39.9	28.8	16.97	59.2	28.3	22.89	64.4	28.4	22.55	45.4
29.6	55.94	40.2	29.8	17.39	59.0	29.3	22.52	64.5	29.4	21.68	45.6
30.6	56.70	40.5	30.8	17.85	58.8	30.3	22.14	64.6	30.4	20.75	45.9
31.6	57.46	40.8	31.8	18.32	58.6	31.3	21.74	64.8	31.4	19.75	46.2
32.6	58.20	41.1	32.8	18.82	58.4	32.3	21.32	65.0	32.4	18.67	46.5

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Sept.	<sup>h</sup> 1 17	<sup>m</sup> +88° 41'	Sept.	<sup>h</sup> 6 46	<sup>m</sup> +87° 12'	Sept.	<sup>h</sup> 18 9	<sup>m</sup> +86° 37'	Sept.	<sup>h</sup> 19 38	<sup>m</sup> +88° 57'
1.6	58.20	41.1	1.8	18.82	58.4	1.3	21.32	5.0	1.4	78.67	46.5
2.6	58.90	41.5	2.8	19.34	58.2	2.3	20.89	5.1	2.4	77.52	46.7
3.6	59.53	41.8	3.8	19.88	58.1	3.3	20.45	5.2	3.4	76.32	47.0
4.6	60.10	42.2	4.8	20.41	57.9	4.3	20.02	5.3	4.4	75.09	47.2
5.6	60.60	42.5	5.8	20.92	57.8	5.3	19.59	5.4	5.4	73.86	47.4
6.6	61.07	42.9	6.8	21.42	57.7	6.3	19.17	5.4	6.4	72.67	47.6
7.6	61.52	43.2	7.8	21.89	57.6	7.3	18.77	5.5	7.4	71.53	47.8
8.6	61.96	43.5	8.8	22.33	57.5	8.3	18.38	5.5	8.4	70.44	48.0
9.6	62.42	43.8	9.8	22.76	57.4	9.3	18.00	5.6	9.4	69.39	48.2
10.6	62.94	44.1	10.8	23.19	57.2	10.3	17.62	5.6	10.4	68.37	48.4
11.6	63.50	44.4	11.8	23.64	57.1	11.3	17.24	5.7	11.4	67.34	48.6
12.6	64.09	44.7	12.8	24.10	56.9	12.3	16.84	5.8	12.4	66.27	48.8
13.6	64.68	45.0	13.8	24.59	56.8	13.3	16.43	5.9	13.4	65.15	49.0
14.6	65.27	45.4	14.8	25.10	56.6	14.3	16.01	6.0	14.4	63.97	49.3
15.6	65.84	45.7	15.8	25.65	56.5	15.3	15.57	6.1	15.4	62.72	49.5
16.6	66.35	46.0	16.8	26.19	56.4	16.3	15.12	6.2	16.3	61.42	49.7
17.6	66.78	46.5	17.8	26.74	56.3	17.3	14.67	6.2	17.3	60.08	49.9
18.6	67.15	46.8	18.8	27.28	56.2	18.3	14.22	6.2	18.3	58.72	50.0
19.5	67.47	47.2	19.8	27.80	56.2	19.3	13.79	6.2	19.3	57.40	50.2
20.5	67.75	47.6	20.8	28.31	56.1	20.3	13.37	6.2	20.3	56.12	50.3
21.5	68.02	47.9	21.8	28.79	56.1	21.3	12.97	6.2	21.3	54.88	50.4
22.5	68.30	48.2	22.8	29.25	56.0	22.3	12.58	6.2	22.3	53.69	50.6
23.5	68.61	48.6	23.8	29.71	56.0	23.2	12.19	6.2	23.3	52.54	50.7
24.5	68.96	48.9	24.8	30.17	55.9	24.2	11.81	6.2	24.3	51.40	50.8
25.5	69.36	49.2	25.7	30.65	55.8	25.2	11.42	6.2	25.3	50.26	51.0
26.5	69.79	49.6	26.7	31.16	55.7	26.2	11.01	6.3	26.3	49.07	51.2
27.5	70.22	49.9	27.7	31.68	55.6	27.2	10.59	6.3	27.3	47.81	51.3
28.5	70.63	50.3	28.7	32.24	55.5	28.2	10.14	6.3	28.3	46.48	51.5
29.5	71.01	50.7	29.7	32.82	55.5	29.2	9.68	6.3	29.3	45.08	51.7
30.5	71.33	51.1	30.7	33.41	55.4	30.2	9.22	6.3	30.3	43.63	51.8
31.5	71.58	51.5	31.7	34.00	55.4	31.2	8.76	6.3	31.3	42.15	51.9



## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Oct.	<sup>h</sup> 1 <sup>m</sup> 18	+88° 41'	Oct.	<sup>h</sup> 6 <sup>m</sup> 46	+87° 12'	Oct.	<sup>h</sup> 18 <sup>m</sup> 8	+86° 37'	Oct.	<sup>h</sup> 19 <sup>m</sup> 37	+88° 57'
1.5	<sup>s</sup> 11.58	51.5	1.7	<sup>s</sup> 34.00	55.4	1.2	<sup>s</sup> 68.76	6.3	1.3	<sup>s</sup> 102.15	51.9
2.5	11.77	51.9	2.7	34.56	55.4	2.2	68.30	6.2	2.3	100.67	52.0
3.5	11.90	52.3	3.7	35.10	55.4	3.2	67.86	6.1	3.3	99.22	52.1
4.5	12.00	52.7	4.7	35.64	55.4	4.2	67.44	6.0	4.3	97.82	52.2
5.5	12.10	53.1	5.7	36.13	55.5	5.2	67.02	6.0	5.3	96.49	52.2
6.5	12.21	53.4	6.7	36.61	55.5	6.2	66.63	5.9	6.3	95.20	52.3
7.5	12.35	53.8	7.7	37.09	55.5	7.2	66.24	5.8	7.3	93.95	52.4
8.5	12.52	54.1	8.7	37.57	55.5	8.2	65.85	5.8	8.3	92.71	52.5
9.5	12.73	54.5	9.7	38.06	55.4	9.2	65.46	5.7	9.3	91.45	52.6
10.5	12.96	54.8	10.7	38.56	55.4	10.2	65.06	5.7	10.3	90.16	52.7
11.5	13.19	55.2	11.7	39.09	55.4	11.2	64.64	5.7	11.3	88.82	52.8
12.5	13.40	55.6	12.7	39.65	55.4	12.2	64.21	5.6	12.3	87.43	52.9
13.5	13.56	56.0	13.7	40.22	55.4	13.2	63.77	5.5	13.3	85.99	53.0
14.5	13.66	56.4	14.7	40.79	55.4	14.2	63.33	5.5	14.3	84.50	53.1
15.5	13.67	56.8	15.7	41.35	55.4	15.2	62.90	5.3	15.3	83.00	53.1
16.5	13.62	57.2	16.7	41.90	55.5	16.2	62.48	5.2	16.3	81.52	53.1
17.5	13.53	57.6	17.7	42.42	55.6	17.2	62.07	5.1	17.3	80.08	53.1
18.5	13.42	58.0	18.7	42.92	55.7	18.2	61.68	4.9	18.3	78.69	53.1
19.5	13.30	58.3	19.7	43.39	55.8	19.2	61.30	4.8	19.3	77.36	53.1
20.5	13.20	58.7	20.7	43.85	55.9	20.2	60.94	4.6	20.2	76.07	53.1
21.5	13.14	59.0	21.7	44.31	55.9	21.2	60.59	4.5	21.2	74.82	53.1
22.5	13.13	59.3	22.7	44.77	56.0	22.2	60.23	4.4	22.2	73.58	53.1
23.5	13.16	59.7	23.7	45.25	56.0	23.2	59.85	4.3	23.2	72.31	53.1
24.5	13.19	60.0	24.7	45.76	56.0	24.2	59.47	4.2	24.2	71.00	53.2
25.4	13.22	60.4	25.7	46.30	56.1	25.2	59.07	4.1	25.2	69.63	53.2
26.4	13.21	60.8	26.7	46.86	56.1	26.2	58.65	3.9	26.2	68.19	53.2
27.4	13.15	61.2	27.7	47.42	56.2	27.2	58.23	3.8	27.2	66.70	53.2
28.4	13.03	61.6	28.7	47.99	56.3	28.2	57.81	3.6	28.2	65.18	53.2
29.4	12.84	62.1	29.7	48.54	56.4	29.2	57.40	3.4	29.2	63.66	53.2
30.4	12.59	62.4	30.7	49.08	56.6	30.1	57.01	3.2	30.2	62.16	53.2
31.4	12.29	62.8	31.7	49.58	56.8	31.1	56.64	3.0	31.2	60.71	53.1
32.4	11.97	63.2	32.7	50.06	56.9	32.1	56.28	2.8	32.2	59.33	53.0

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Nov.	<sup>h</sup> 1 <sup>m</sup> 17	+88° 42'	Nov.	<sup>h</sup> 6 <sup>m</sup> 46	+87° 12'	Nov.	<sup>h</sup> 18 <sup>m</sup> 8	+86° 36'	Nov.	<sup>h</sup> 19 <sup>m</sup> 37	+86° 57'
1.4	<sup>s</sup> 71.97	3.2	1.7	<sup>s</sup> 50.06	56.9	1.1	<sup>s</sup> 56.28	62.8	1.2	<sup>s</sup> 59.33	53.0
2.4	71.66	3.5	2.7	50.51	57.0	2.1	55.94	62.6	2.2	58.03	53.0
3.4	71.38	3.9	3.7	50.94	57.2	3.1	55.62	62.4	3.2	56.77	52.9
4.4	71.13	4.2	4.6	51.37	57.3	4.1	55.30	62.2	4.2	55.54	52.8
5.4	70.92	4.5	5.6	51.80	57.4	5.1	54.98	62.0	5.2	54.32	52.8
6.4	70.74	4.8	6.6	52.25	57.5	6.1	54.66	61.9	6.2	53.08	52.7
7.4	70.56	5.2	7.6	52.71	57.6	7.1	54.33	61.7	7.2	51.80	52.7
8.4	70.36	5.5	8.6	53.20	57.7	8.1	53.97	61.5	8.2	50.48	52.7
9.4	70.12	5.9	9.6	53.71	57.9	9.1	53.61	61.3	9.2	49.12	52.6
10.4	69.92	6.3	10.6	54.21	58.0	10.1	53.25	61.1	10.2	47.71	52.5
11.4	69.46	6.6	11.6	54.70	58.2	11.1	52.90	60.9	11.2	46.29	52.5
12.4	69.02	7.0	12.6	55.18	58.4	12.1	52.56	60.6	12.2	44.88	52.3
13.4	68.53	7.4	13.6	55.64	58.6	13.1	52.24	60.4	13.2	43.52	52.2
14.4	68.00	7.7	14.6	56.07	58.8	14.1	51.93	60.1	14.2	42.22	52.0
15.4	67.47	8.0	15.6	56.47	59.0	15.1	51.65	59.8	15.2	40.98	51.9
16.4	66.95	8.3	16.6	56.85	59.3	16.1	51.38	59.5	16.2	39.81	51.8
17.4	66.48	8.6	17.6	57.22	59.5	17.1	51.12	59.3	17.2	38.68	51.6
18.4	66.04	8.9	18.6	57.58	59.6	18.1	50.87	59.0	18.2	37.58	51.5
19.4	65.63	9.2	19.6	57.96	59.8	19.1	50.61	58.8	19.2	36.48	51.3
20.4	65.25	9.5	20.6	58.37	60.0	20.1	50.34	58.6	20.2	35.35	51.2
21.4	64.87	9.8	21.6	58.78	60.1	21.1	50.06	58.4	21.2	34.18	51.1
22.4	64.47	10.1	22.6	59.22	60.3	22.1	49.76	58.1	22.2	32.95	51.0
23.4	64.03	10.5	23.6	59.68	60.5	23.1	49.46	57.9	23.2	31.67	50.9
24.4	63.53	10.8	24.6	60.14	60.7	24.1	49.16	57.6	24.2	30.36	50.7
25.4	63.95	11.2	25.6	60.58	61.0	25.1	48.87	57.3	25.2	29.03	50.6
26.4	62.31	11.5	26.6	61.00	61.2	26.1	48.59	57.0	26.2	27.73	50.4
27.4	61.63	11.8	27.6	61.38	61.5	27.1	48.33	56.7	27.2	26.50	50.3
28.4	60.92	12.1	28.6	61.74	61.8	28.1	48.10	56.3	28.2	25.34	50.0
29.4	60.21	12.4	29.6	62.06	62.0	29.1	47.89	56.0	29.2	24.25	49.8
30.3	59.52	12.6	30.6	62.37	62.3	30.1	47.70	55.7	30.2	23.23	49.5
31.3	58.87	12.9	31.6	62.66	62.5	31.1	47.51	55.4	31.2	22.26	49.3

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Dec.	<sup>h</sup> <sup>m</sup> 1 17	+88° 42'	Dec.	<sup>h</sup> <sup>m</sup> 6 47	+87° 13'	Dec.	<sup>h</sup> <sup>m</sup> 18 8	+86° 36'	Dec.	<sup>h</sup> <sup>m</sup> 19 36	+88° 57'
1.3	<sup>s</sup> 58.87	12.9	1.6	<sup>s</sup> 2.66	2.5	1.1	<sup>s</sup> 47.51	55.4	1.1	<sup>s</sup> 82.26	49.3
2.3	58.25	13.1	2.6	2.95	2.8	2.1	47.33	55.1	2.1	81.32	49.1
3.3	57.67	13.3	3.6	3.25	3.0	3.1	47.15	54.8	3.1	80.38	49.0
4.3	57.10	13.6	4.6	3.57	3.2	4.1	46.96	54.6	4.1	79.42	48.8
5.3	56.53	13.8	5.6	3.91	3.5	5.0	46.76	54.3	5.1	78.42	48.6
6.3	55.94	14.1	6.6	4.25	3.7	6.0	46.55	54.0	6.1	77.37	48.4
7.3	55.29	14.4	7.6	4.60	4.0	7.0	46.35	53.7	7.1	76.29	48.2
8.3	54.57	14.7	8.6	4.94	4.2	8.0	46.15	53.4	8.1	75.21	48.0
9.3	53.79	14.9	9.5	5.27	4.5	9.0	45.96	53.1	9.1	74.14	47.8
10.3	52.96	15.2	10.5	5.58	4.8	10.0	45.79	52.7	10.1	73.12	47.5
11.3	52.09	15.4	11.5	5.85	5.1	11.0	45.63	52.4	11.1	72.15	47.2
12.3	51.21	15.6	12.5	6.08	5.5	12.0	45.50	52.0	12.1	71.26	46.9
13.3	50.33	15.8	13.5	6.29	5.8	13.0	45.39	51.6	13.1	70.45	46.6
14.3	49.47	16.0	14.5	6.48	6.1	14.0	45.29	51.3	14.1	69.69	46.4
15.3	48.67	16.1	15.5	6.68	6.4	15.0	45.21	51.0	15.1	68.98	46.1
16.3	47.92	16.3	16.5	6.87	6.6	16.0	45.12	50.7	16.1	68.28	45.8
17.3	47.19	16.5	17.5	7.07	6.9	17.0	45.02	50.4	17.1	67.59	45.6
18.3	46.48	16.7	18.5	7.29	7.2	18.0	44.92	50.1	18.1	66.97	45.4
19.3	45.77	16.9	19.5	7.53	7.4	19.0	44.81	49.8	19.1	66.10	45.1
20.3	45.03	17.1	20.5	7.79	7.7	20.0	44.68	49.5	20.1	65.28	44.9
21.3	44.24	17.3	21.5	8.05	8.0	21.0	44.56	49.1	21.1	64.43	44.6
22.3	43.39	17.5	22.5	8.30	8.3	22.0	44.45	48.8	22.1	63.57	44.4
23.3	42.48	17.7	23.5	8.52	8.6	23.0	44.34	48.4	23.1	62.74	44.1
24.3	41.51	17.9	24.5	8.72	9.0	24.0	44.26	48.1	24.1	61.95	43.8
25.3	40.52	18.0	25.5	8.89	9.3	25.0	44.20	47.7	25.1	61.23	43.4
26.3	39.52	18.2	26.5	9.01	9.7	26.0	44.17	47.3	26.1	60.60	43.1
27.3	38.53	18.3	27.5	9.11	10.0	27.0	44.15	46.9	27.1	60.05	42.8
28.3	37.58	18.4	28.5	9.20	10.3	28.0	44.15	46.6	28.1	59.57	42.5
29.3	36.68	18.5	29.5	9.28	10.6	29.0	44.15	46.2	29.1	59.13	42.2
30.3	35.83	18.6	30.5	9.35	10.9	30.0	44.16	45.9	30.1	58.70	41.9
31.3	35.01	18.6	31.5	9.43	11.2	31.0	44.17	45.6	31.1	58.27	41.6
32.3	34.19	18.7	32.5	9.53	11.5	32.0	44.17	45.3	32.1	57.83	41.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Andromedæ.		$\gamma$ Pegasi. (Algenib.)		$\beta$ Hydri.		12 Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 0 <sup>m</sup> 2	<sup>s</sup> +28° 27'	<sup>h</sup> 0 <sup>m</sup> 7	<sup>s</sup> +14° 32'	<sup>h</sup> 0 <sup>m</sup> 19	<sup>s</sup> -77° 53'	<sup>h</sup> 0 <sup>m</sup> 24	<sup>s</sup> - 4° 35'
(Dec. 30.2)	26.99 -.14	20.2 -0.8	19.06 -.13	43.7 -0.8	38.07 -.24	86.9 +0.7	10.26 -.12	36.9 -0.7
Jan. 9.2	26.84 .14	28.3 1.1	18.94 .12	42.8 1.0	37.16 .89	86.0 1.3	10.14 .12	37.6 0.6
19.2	26.70 .13	27.0 1.4	18.82 .11	41.8 1.0	36.30 .82	84.4 1.9	10.02 .11	38.1 0.5
29.2	26.57 .12	25.5 1.5	18.71 .10	40.7 1.1	35.53 .72	82.2 2.4	9.91 .10	38.6 0.4
Feb. 8.1	26.47 .10	23.9 1.6	18.62 .08	39.6 1.1	34.86 .61	79.6 2.8	9.82 .09	38.9 -0.2
18.1	26.38 -.07	22.2 -1.7	18.54 -.06	38.5 -1.0	34.31 -.48	76.6 +3.2	9.74 -.07	39.1 0.0
28.1	26.33 -.04	20.5 1.7	18.50 -.03	37.5 0.9	33.90 .34	73.3 3.4	9.68 .04	39.0 +0.2
Mar. 10.0	26.31 .00	18.9 1.5	18.48 .00	36.6 0.8	33.63 .19	69.8 3.6	9.65 -.01	38.8 0.4
20.0	26.33 +0.5	17.5 1.4	18.51 +0.4	35.9 0.6	33.52 -.03	66.1 3.7	9.66 +0.2	38.3 0.6
30.0	26.40 .09	16.2 1.1	18.57 .08	35.5 -0.3	33.56 +1.2	62.3 3.8	9.70 .06	37.6 0.8
Apr. 9.0	26.51 +1.4	15.2 -0.8	18.67 +1.2	35.3 0.0	33.76 +2.2	58.5 +2.7	9.78 +1.0	36.7 +1.1
18.9	26.68 .18	14.6 0.4	18.81 .16	35.5 +0.3	34.12 .43	54.8 3.6	9.90 .14	35.5 1.3
28.9	26.88 .22	14.3 -0.1	19.00 .20	35.9 0.6	34.63 .58	51.3 3.4	10.07 .18	34.0 1.5
May 8.9	27.13 .26	14.5 +0.3	19.22 .24	36.6 0.9	35.28 .72	48.1 3.1	10.27 .22	32.4 1.7
18.8	27.40 .29	15.0 0.7	19.47 .27	37.7 1.2	36.06 .83	45.2 2.7	10.50 .25	30.6 1.8
28.8	27.71 +3.1	15.9 +1.1	19.76 +2.2	39.0 +1.5	36.95 +2.4	42.6 +2.3	10.76 +2.7	28.7 +1.9
June 7.8	28.03 .33	17.1 1.4	20.05 .30	40.6 1.7	37.94 1.02	40.5 1.9	11.05 .29	26.7 2.0
17.8	28.37 .33	18.7 1.7	20.36 .31	42.4 1.9	38.99 1.07	38.9 1.4	11.35 .30	24.7 2.0
27.7	28.70 .33	20.6 2.0	20.68 .31	44.4 2.0	40.08 1.10	37.9 0.8	11.65 .30	22.7 2.0
July 7.7	29.02 .32	22.7 2.2	20.98 .30	46.4 2.1	41.18 1.09	37.3 +0.2	11.96 .30	20.8 1.9
17.7	29.33 +3.0	24.9 +2.3	21.27 +2.2	48.5 +2.1	42.27 1.06	37.4 -0.4	12.25 +2.2	19.0 +1.7
27.7	29.62 .27	27.3 2.4	21.55 .26	50.6 2.1	43.30 1.00	38.0 0.9	12.53 .26	17.4 1.5
Aug. 6.0	29.87 .24	29.8 2.4	21.79 .23	52.6 2.0	44.26 .90	39.3 1.4	12.78 .24	16.0 1.3
16.6	30.09 .20	32.2 2.4	22.00 .19	54.6 1.9	45.10 .77	41.0 1.9	13.00 .21	14.8 1.0
26.6	30.27 .16	34.6 2.4	22.17 .16	56.4 1.7	45.81 .63	43.1 2.4	13.19 .17	14.0 0.7
Sept. 5.5	30.41 +1.2	36.9 +2.2	22.31 +1.2	58.0 +1.5	46.36 +.46	45.7 -2.7	13.34 +1.3	13.4 +0.5
15.5	30.51 .08	39.1 2.1	22.41 .08	59.5 1.3	46.73 .28	48.6 2.9	13.46 .10	13.0 +0.2
25.5	30.56 +0.4	41.1 1.9	22.47 .04	60.7 1.1	46.92 +1.0	51.6 3.1	13.53 .06	12.9 0.0
Oct. 5.5	30.58 .00	42.9 1.7	22.50 +0.1	61.7 0.9	46.92 -1.0	54.7 3.1	13.58 +0.3	13.1 -0.2
15.4	30.57 -.03	44.4 1.4	22.49 -.02	62.4 0.7	46.72 .28	57.8 3.0	13.59 -.01	13.5 0.5
25.4	30.52 -.06	45.7 +1.2	22.46 -.05	63.0 +0.4	46.35 -.45	60.8 -2.8	13.56 -.03	14.0 -0.6
Nov. 4.4	30.45 .08	46.8 0.9	22.40 .07	63.3 +0.2	45.81 .61	63.4 2.4	13.52 .06	14.7 0.7
14.4	30.35 .11	47.5 0.6	22.31 .09	63.4 0.0	45.14 .73	65.7 2.0	13.45 .08	15.5 0.8
24.3	30.23 .12	47.9 +0.3	22.22 .10	63.3 -0.2	44.35 .83	67.4 1.5	13.36 .09	16.3 0.8
Dec. 4.3	30.10 .14	48.0 -0.1	22.11 .11	63.0 0.4	43.47 .90	68.7 0.9	13.26 .10	17.2 0.8
14.3	29.96 -.15	47.8 -0.3	21.99 -.12	62.5 -0.6	42.55 -.23	69.3 -0.3	13.15 -.10	18.0 -0.8
24.2	29.81 .15	47.3 0.7	21.86 .13	61.8 0.7	41.61 .93	69.3 +0.3	13.04 .12	18.8 0.8
34.2	29.66 -.15	46.4 -0.9	21.74 -.13	61.0 -0.9	40.68 -.22	68.7 +0.2	12.92 -.12	19.5 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Cassiopeæ.		$\beta$ Ceti.		$\gamma$ Cassiopeæ.		$\delta$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 0 33	+55° 54'	<sup>h</sup> <sup>m</sup> 0 37	-18° 36'	<sup>h</sup> <sup>m</sup> 0 38	+74° 21'	<sup>h</sup> <sup>m</sup> 0 56	+7° 16'
(Dec. 30.3)	60.33 -30	39.0 0.0	49.01 -14	73.3 -0.7	6.53 -72	52.2 +0.2	58.90 -12	14.6 -0.8
Jan. 9.2	60.04 .29	38.6 -0.7	48.88 .13	73.8 0.4	5.81 .71	52.1 -0.4	58.78 .13	13.9 0.8
19.2	59.75 .28	37.6 1.2	48.74 .13	74.1 -0.2	5.10 .70	51.4 1.0	58.65 .13	13.1 0.8
29.2	59.47 .27	36.1 1.7	48.62 .12	74.1 +0.1	4.42 .65	50.1 1.6	58.52 .12	12.4 0.7
Feb. 8.1	59.21 .24	34.2 2.0	48.51 .10	73.9 0.4	3.80 .58	48.3 2.0	58.40 .11	11.7 0.7
18.1	59.00 -19	32.0 -2.3	48.41 -0.8	73.4 +0.6	3.28 -48	46.1 -2.4	58.30 -10	11.0 -0.6
28.1	58.83 .14	29.6 2.5	48.34 .06	72.6 0.9	2.84 .36	43.4 2.8	58.21 .07	10.5 0.5
Mar. 10.1	58.72 .08	27.0 2.6	48.29 -0.3	71.6 1.2	2.54 .23	40.5 2.9	58.15 .04	10.0 0.3
20.1	58.68 -0.1	24.4 2.6	48.28 +0.1	70.3 1.4	2.39 -0.8	37.5 3.0	58.12 -0.1	9.8 -0.1
30.0	58.71 +0.7	21.9 2.4	48.31 .05	68.7 1.7	2.39 +0.8	34.5 3.1	58.13 +0.3	9.8 +0.1
Apr. 9.0	58.81 +1.4	19.5 -2.2	48.37 +0.9	66.9 +1.9	2.54 +2.3	31.5 -2.8	58.19 +0.7	10.0 +0.3
19.0	58.99 .21	17.4 1.9	48.48 .13	65.0 2.0	2.84 .37	28.8 2.6	58.28 .11	10.5 0.6
29.0	59.24 .28	15.7 1.5	48.63 .17	62.9 2.2	3.29 .51	26.4 2.8	58.42 .16	11.2 0.9
May 8.9	59.55 .24	14.4 1.1	48.83 .21	60.6 2.3	3.86 .68	24.4 1.8	58.59 .20	12.2 1.1
18.9	59.92 .29	13.5 0.6	49.05 .24	58.3 2.3	4.54 .72	22.9 1.3	58.81 .23	13.5 1.3
28.9	60.33 +4.3	13.2 -0.1	49.31 +2.7	56.0 +2.3	5.30 +2.8	21.9 -0.7	59.06 +2.8	14.9 +1.5
June 7.8	60.78 .46	13.3 +0.4	49.60 .29	53.7 2.2	6.13 .85	21.4 -0.2	59.33 .28	16.5 1.7
17.8	61.25 .47	14.0 0.9	49.90 .31	51.5 2.1	7.00 .88	21.5 +0.4	59.62 .30	18.3 1.8
27.8	61.72 .47	15.1 1.3	50.22 .31	49.5 1.9	7.88 .88	22.1 0.9	59.93 .30	20.2 1.9
July 7.8	62.19 .46	16.6 1.8	50.53 .31	47.7 1.7	8.76 .86	23.2 1.4	60.23 .30	22.1 1.9
17.7	62.64 +4.4	18.6 +2.1	50.84 +3.0	46.1 +1.4	9.60 +2.8	24.9 +1.9	60.53 +2.8	24.1 +1.9
27.7	63.06 .41	20.9 2.5	51.13 .28	44.8 1.1	10.39 .76	27.0 2.3	60.82 .28	25.9 1.8
Aug. 6.7	63.45 .37	23.5 2.7	51.40 .26	43.9 0.8	11.12 .70	29.5 2.7	61.09 .26	27.7 1.7
16.6	63.79 .29	26.3 2.9	51.64 .22	43.3 +0.4	11.76 .60	32.3 3.0	61.33 .23	29.3 1.5
26.6	64.08 .26	29.4 3.1	51.85 .19	43.1 0.0	12.31 .50	35.5 3.3	61.55 .20	30.7 1.3
Sept. 5.6	64.32 +2.0	32.5 +2.2	52.02 +1.5	43.2 -0.3	12.76 +2.8	38.9 +3.4	61.73 +1.6	31.9 +1.1
15.6	64.50 .15	35.7 2.2	52.16 .11	43.6 0.6	13.09 .28	42.4 3.6	61.87 .13	32.9 0.9
25.5	64.62 .10	38.9 3.1	52.25 .08	44.4 0.9	13.31 .16	46.0 3.6	61.98 .09	33.7 0.7
Oct. 5.5	64.69 +0.4	41.9 3.0	52.31 +0.4	45.4 1.1	13.41 +0.4	49.6 3.6	62.06 .06	34.2 0.4
15.5	64.69 -0.2	44.9 2.8	52.33 .00	46.6 1.3	13.40 -0.7	53.2 3.5	62.11 +0.3	34.5 +0.2
25.5	64.65 -0.7	47.6 +2.6	52.31 -0.3	47.9 -1.4	13.26 -1.9	56.0 +3.3	62.12 .00	34.7 0.0
Nov. 4.4	64.56 .12	50.1 2.3	52.27 .06	49.3 1.4	13.02 .20	59.7 3.0	62.10 -0.3	34.6 -0.1
14.4	64.42 .16	52.2 2.0	52.20 .08	50.7 1.4	12.66 .41	62.6 2.7	62.07 .05	34.4 0.3
24.4	64.23 .20	54.0 1.5	52.11 .10	52.1 1.3	12.21 .50	65.0 2.2	62.01 .07	34.0 0.4
Dec. 4.3	64.01 .24	55.3 1.1	52.00 .11	53.3 1.2	11.66 .58	67.0 1.7	61.92 .09	33.5 0.5
14.3	63.76 -2.6	56.2 +0.6	51.88 -1.2	54.4 -1.0	11.04 -0.5	68.5 +1.2	61.83 -1.0	32.9 -0.6
24.3	63.48 .28	56.5 +0.1	51.76 .13	55.3 0.8	10.36 .69	69.4 +0.6	61.72 .12	32.3 0.7
34.3	63.19 -2.2	56.4 -0.4	51.62 -1.4	56.0 -0.6	9.65 -0.73	69.7 0.0	61.60 -1.2	31.6 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Andromedæ.		$\theta^1$ Ceti.		38 Cassiopeæ.		$\eta$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 1 3	+35° 0'	h m 1 18	— 8° 46'	h m 1 22	+69° 40'	h m 1 25	+14° 45'
(Dec.30.3)	18.56 —.16	46.9 —0.3	16.86 —.12	44.0 —0.9	43.76 —.48	35.9 +0.7	20.48 —.12	10.9 —0.6
Jan. 9.3	18.39 .17	46.5 0.7	16.73 .13	44.7 0.7	43.25 .52	36.3 +0.1	20.35 .13	10.2 0.7
19.2	18.21 .18	45.6 1.0	16.60 .13	45.3 0.5	42.72 .54	36.1 —0.5	20.22 .14	9.5 0.8
29.2	18.04 .17	44.5 1.2	16.46 .12	45.8 0.2	42.18 .52	35.3 1.0	20.08 .14	8.7 0.8
Feb. 8.2	17.88 .16	43.2 1.4	16.33 .11	46.0 —0.1	41.67 .49	34.0 1.5	19.94 .13	7.9 0.8
18.1	17.73 —.14	41.6 —1.6	16.21 —.09	46.0 +0.1	41.20 —.44	32.2 —2.0	19.81 —.12	7.0 —0.8
28.1	17.60 .11	40.0 1.7	16.11 .06	45.8 0.3	40.79 .36	30.0 2.4	19.70 .10	6.2 0.8
Mar. 10.1	17.52 .07	38.2 1.7	16.03 —.03	45.4 0.5	40.47 .37	27.5 2.6	19.61 .07	5.4 0.7
20.1	17.47 —.02	36.5 1.6	15.98 +0.1	44.7 0.8	40.25 .16	24.8 2.8	19.55 —.04	4.8 0.5
30.0	17.47 +0.2	34.9 1.5	15.97 .04	43.8 1.0	40.14 —.05	21.9 2.8	19.54 .00	4.4 0.3
Apr. 9.0	17.52 +0.6	33.5 —1.3	15.99 +0.9	42.6 +1.3	40.15 +0.7	19.1 —2.8	19.56 +0.5	4.1 —0.1
19.0	17.62 .13	32.4 1.1	16.06 .13	41.3 1.5	40.28 .19	16.3 2.6	19.63 .09	4.1 +0.1
29.0	17.78 .18	31.5 0.7	16.17 .17	39.7 1.7	40.53 .31	13.9 2.3	19.74 .14	4.3 0.4
May 8.9	17.98 .23	31.0 —0.3	16.32 .21	37.9 1.9	40.90 .41	11.7 2.0	19.90 .15	4.8 0.6
18.9	18.23 .27	30.8 0.0	16.51 .24	35.9 2.0	41.36 .51	9.9 1.6	20.10 .22	5.6 0.9
28.9	18.52 +0.30	31.0 +0.4	16.74 +0.27	33.9 +2.1	41.91 +0.58	8.5 —1.1	20.34 +0.25	6.7 +1.2
June 7.8	18.84 .33	31.6 0.8	17.00 .29	31.8 2.1	42.53 .65	7.6 0.6	20.60 .28	7.9 1.4
17.8	19.18 .35	32.6 1.1	17.28 .30	29.6 2.1	43.20 .69	7.3 —0.1	20.89 .30	9.4 1.6
27.8	19.53 .35	33.9 1.4	17.58 .30	27.6 2.0	43.90 .71	7.4 +0.4	21.20 .31	11.1 1.7
July 7.8	19.89 .35	35.5 1.7	17.88 .30	25.6 1.9	44.62 .72	8.1 0.9	21.51 .31	12.8 1.8
17.7	20.23 +0.34	37.4 +2.0	18.18 +0.29	23.8 +1.7	45.33 +0.70	9.2 +1.4	21.82 +0.31	14.7 +1.9
27.7	20.57 .32	39.4 2.1	18.48 .27	22.2 1.5	46.03 .67	10.9 1.8	22.12 .29	16.5 1.8
Aug. 6.7	20.88 .30	41.7 2.2	18.76 .24	20.8 1.2	46.68 .63	12.9 2.2	22.40 .27	18.4 1.8
16.6	21.16 .27	44.0 2.3	19.01 .21	19.7 0.9	47.29 .58	15.3 2.6	22.67 .25	20.1 1.7
26.6	21.42 .23	46.4 2.4	19.24 .18	19.0 0.6	47.83 .51	18.0 2.9	22.91 .22	21.8 1.6
Sept. 5.6	21.63 +0.20	48.7 +2.3	19.44 +1.5	18.5 +0.3	48.31 +0.44	21.0 +3.1	23.11 +1.9	23.3 +1.4
15.6	21.80 .16	51.1 2.3	19.60 .11	18.4 0.0	48.71 .36	24.2 3.3	23.29 .16	24.6 1.2
25.5	21.94 .12	53.3 2.2	19.74 .08	18.5 —0.3	49.03 .27	27.5 3.4	23.43 .12	25.8 1.0
Oct. 5.5	22.04 .08	55.4 2.0	19.83 .05	19.0 0.6	49.26 .19	30.9 3.4	23.54 .09	26.7 0.8
15.5	22.10 +0.04	57.3 1.8	19.89 +0.2	19.6 0.8	49.40 .09	34.3 3.4	23.62 .06	27.5 0.6
25.5	22.11 .00	59.1 +1.6	19.92 —.01	20.5 —0.9	49.45 +0.01	37.7 +3.3	23.66 +0.04	28.0 +0.5
Nov. 4.4	22.10 —.03	60.6 1.4	19.92 .04	21.5 1.0	49.40 —.09	40.8 3.1	23.68 .00	28.4 0.3
14.4	22.05 .06	61.0 1.1	19.90 .06	22.6 1.1	49.27 .18	43.8 2.8	23.66 —.02	28.6 +0.1
24.4	21.98 .09	62.9 0.8	19.85 .08	23.8 1.1	49.04 .26	46.4 2.5	23.63 .05	28.6 —0.1
Dec. 4.3	21.88 .11	63.6 0.5	19.77 .10	24.9 1.1	48.74 .34	48.7 2.1	23.56 .07	28.4 0.2
14.3	21.75 —.13	64.0 +0.2	19.68 —.11	26.0 —1.0	48.36 —.41	50.5 +1.6	23.48 —.09	28.1 —0.4
24.3	21.61 .15	64.0 —0.1	19.57 .12	26.9 0.9	47.92 .47	51.8 1.1	23.38 .11	27.7 0.5
34.3	21.44 —.17	63.7 —0.4	19.45 —.12	27.8 —0.6	47.43 —.52	52.6 +0.5	23.26 —.13	27.1 —0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON:

Mean Solar Date.	$\alpha$ Eridani. ( <i>Achernar</i> .)		$\sigma$ Piscium.		$\beta$ Arietis.		50 Cassiopeæ.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 1 <sup>m</sup> 33	—57° 48'	<sup>h</sup> 1 <sup>m</sup> 39	+ 8° 34'	<sup>h</sup> 1 <sup>m</sup> 48	+20° 14'	<sup>h</sup> 1 <sup>m</sup> 53	+71° 51'
(Dec. 30.3)	25.36 —.33	96.7 —0.8	19.95 —.11	40.8 —0.7	18.15 —.11	45.6 —0.4	41.32 —.58	65.0 +1.1
Jan. 9.3	25.03 .34	97.2 —0.2	19.83 .13	40.1 0.7	18.02 .14	45.1 0.6	40.77 .57	65.9 +0.6
19.2	24.69 .34	97.1 +0.4	19.70 .14	39.4 0.7	17.88 .15	44.5 0.7	40.17 .61	66.1 0.0
29.2	24.35 .33	96.5 0.9	19.56 .14	38.7 0.7	17.73 .15	43.7 0.8	39.56 .61	65.8 —0.6
Feb. 8.2	24.03 .31	95.3 1.4	19.42 .14	38.1 0.6	17.57 .15	42.9 0.9	38.95 .59	64.9 1.1
18.1	23.73 —.38	93.6 +1.9	19.29 —.12	37.4 —0.6	17.43 —.14	41.9 —0.9	38.37 —.55	63.5 —1.6
28.1	23.47 .34	91.4 2.3	19.17 .11	36.9 0.5	17.29 .12	41.0 0.9	37.85 .48	61.6 2.1
Mar. 10.1	23.25 .19	88.9 2.7	19.08 .08	36.5 0.3	17.18 .09	40.1 0.9	37.41 .39	59.3 2.4
20.1	23.08 .14	86.0 3.0	19.01 .05	36.2 —0.2	17.10 .07	39.2 0.8	37.08 .38	56.8 2.7
30.0	22.97 .08	82.8 3.3	18.96 —.01	36.1 0.0	17.06 —.02	38.5 0.7	36.86 .15	54.0 2.8
Apr. 9.0	22.93 —.01	79.5 +3.4	18.99 +.03	36.2 +0.2	17.06 +.02	37.9 —0.5	36.78 —.02	51.2 —2.8
19.0	22.95 +.06	76.0 3.5	19.04 .07	36.6 0.5	17.11 .07	37.5 —0.3	36.83 +.12	48.4 2.7
29.0	23.05 .13	72.4 3.5	19.14 .12	37.1 0.7	17.20 .12	37.4 0.0	37.01 .25	45.7 2.6
May 8.9	23.22 .20	68.9 3.5	19.28 .16	38.0 0.9	17.35 .16	37.5 +0.3	37.33 .38	43.3 2.3
18.9	23.45 .26	65.5 3.3	19.46 .20	39.0 1.2	17.53 .21	37.9 0.5	37.76 .49	41.2 1.9
28.9	23.74 +.22	62.3 +3.1	19.68 +.24	40.3 +1.4	17.76 +.24	38.5 +0.8	38.31 +.59	39.4 —1.5
June 7.8	24.10 .37	59.3 2.8	19.93 .26	41.8 1.5	18.02 .27	39.5 1.1	38.94 .67	38.1 1.0
17.8	24.50 .42	56.6 2.5	20.21 .29	43.4 1.7	18.31 .30	40.7 1.3	39.65 .73	37.3 0.6
27.8	24.93 .45	54.4 2.0	20.51 .30	45.1 1.8	18.61 .31	42.0 1.5	40.40 .77	37.0 —0.1
July 7.8	25.39 .47	52.5 1.6	20.81 .30	47.0 1.8	18.93 .32	43.6 1.6	41.19 .79	37.2 +0.4
17.7	25.87 +.47	51.3 +1.0	21.11 +.30	48.8 +1.8	19.25 +.32	45.3 +1.7	41.99 +.79	37.9 +0.9
27.7	26.34 .46	50.5 +0.5	21.41 .29	50.6 1.7	19.56 .31	47.0 1.8	42.78 .78	39.1 1.4
Aug. 6.7	26.79 .44	50.3 —0.1	21.70 .28	52.2 1.6	19.86 .29	48.9 1.8	43.54 .75	40.7 1.9
16.6	27.22 .41	50.7 0.7	21.97 .25	53.8 1.5	20.14 .27	50.6 1.8	44.27 .70	42.7 2.2
26.6	27.62 .37	51.7 1.2	22.21 .23	55.3 1.3	20.40 .24	52.4 1.7	44.94 .64	45.1 2.5
Sept. 5.6	27.96 +.31	53.2 —1.7	22.42 +.20	56.5 +1.1	20.63 +.22	54.0 +1.6	45.55 +.57	47.8 +2.8
15.6	28.24 .25	55.1 2.2	22.61 .17	57.5 0.9	20.83 .18	55.5 1.4	46.07 .49	50.8 3.1
25.5	28.46 .18	57.5 2.5	22.76 .14	58.3 0.7	21.00 .15	56.9 1.3	46.52 .40	53.9 3.2
Oct. 5.5	28.61 .11	60.2 2.8	22.88 .10	58.9 0.5	21.14 .12	58.1 1.1	46.87 .30	57.2 3.3
15.5	28.69 +.04	63.1 2.9	22.97 .07	59.2 0.3	21.24 .09	59.2 0.9	47.13 .21	60.6 3.4
25.5	28.70 —.03	66.1 —3.0	23.03 +.04	59.4 +0.1	21.31 +.06	60.0 +0.8	47.29 +.10	63.9 +3.3
Nov. 4.4	28.64 .09	69.1 2.9	23.06 +.02	59.3 —0.1	21.35 +.03	60.7 0.6	47.34 .00	67.2 3.2
14.4	28.52 .15	71.9 2.7	23.06 —.01	59.2 0.2	21.37 .00	61.2 0.4	47.28 —.11	70.3 3.0
24.4	28.34 .20	74.5 2.4	23.03 .04	58.9 0.4	21.35 —.03	61.5 +0.2	47.12 .21	73.3 2.7
Dec. 4.3	28.11 .25	76.8 2.1	22.98 .06	58.4 0.5	21.30 .06	61.7 0.0	46.85 .31	75.8 2.3
14.3	27.84 —.28	78.6 —1.6	22.91 —.06	57.9 —0.6	21.23 —.06	61.6 —0.1	46.49 —.40	78.0 +2.0
24.3	27.54 .31	80.0 1.0	22.81 .10	57.3 0.6	21.13 .11	61.4 0.3	46.05 .49	79.8 1.5
34.3	27.21 —.33	80.8 —0.5	22.70 —.12	56.7 —0.7	21.02 —.13	61.1 —0.4	45.52 —.58	81.0 +0.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Arietis.		$\xi^1$ Ceti.		$\epsilon$ Cassiopeæ.		$\xi^2$ Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 2 <sup>m</sup> 0	+22° 54'	<sup>h</sup> 2 <sup>m</sup> 6	+ 8° 18'	<sup>h</sup> 2 <sup>m</sup> 19	+66° 52'	<sup>h</sup> 2 <sup>m</sup> 22	+ 7° 56'
(Dec.30.3)	<sup>s</sup> 42.48 -12	67.5 -0.3	<sup>s</sup> 55.14 -10	21.4 -0.6	<sup>s</sup> 38.92 -38	75.8 +1.3	<sup>s</sup> 3.61 -09	34.8 -0.7
Jan. 9.3	42.35 .14	67.1 0.5	55.02 .12	20.8 0.7	38.53 .41	76.8 0.8	3.50 .12	34.1 0.6
19.2	42.31 .15	66.6 0.6	54.89 .14	20.1 0.6	38.09 .45	77.3 +0.3	3.38 .14	33.5 0.6
29.2	42.05 .16	65.9 0.8	54.75 .15	19.5 0.6	37.63 .47	77.3 -0.2	3.23 .15	32.9 0.6
Feb. 8.2	41.89 .16	65.1 0.9	54.60 .15	18.8 0.6	37.15 .47	76.7 0.9	3.08 .15	32.3 0.6
18.2	41.73 -15	64.2 -1.0	54.45 -14	18.3 -0.5	36.68 -45	75.6 -1.3	2.93 -15	31.7 -0.5
28.2	41.59 .13	63.2 1.0	54.32 .13	17.8 0.4	36.25 .41	74.0 1.8	2.79 .13	31.3 0.4
Mar. 10.1	41.47 .11	62.2 1.0	54.20 .10	17.4 0.3	35.87 .34	72.0 2.1	2.66 .12	30.9 0.3
20.1	41.38 .07	61.2 0.9	54.11 .07	17.1 -0.2	35.57 .28	69.7 2.4	2.55 .09	30.7 -0.1
30.1	41.32 -03	60.3 0.8	54.05 -04	17.1 0.0	35.35 .17	67.2 2.6	2.48 .06	30.6 0.0
Apr. 9.1	41.31 +02	59.6 -0.6	54.03 .00	17.2 +0.2	35.23 -07	64.6 -2.6	2.45 -01	30.8 +0.2
19.0	41.34 .06	59.1 0.4	54.06 +05	17.5 0.4	35.22 +04	61.9 2.6	2.46 +03	31.1 0.4
29.0	41.43 .11	58.7 -0.2	54.13 .09	18.0 0.6	35.32 .15	59.4 2.5	2.51 .08	31.6 0.7
May 9.0	41.56 .16	58.7 +0.1	54.24 .14	18.8 0.9	35.52 .28	57.0 2.2	2.62 .12	32.4 0.9
18.9	41.74 .20	58.9 0.2	54.40 .18	19.8 1.2	35.83 .35	54.9 1.9	2.76 .17	33.4 1.1
28.9	41.96 +24	59.4 +0.6	54.60 +22	21.0 +1.3	36.23 +44	53.2 -1.6	2.95 +20	34.6 +1.3
June 7.9	42.22 .28	60.1 0.9	54.84 .25	22.4 1.5	36.71 .51	51.8 1.2	3.17 .24	36.0 1.4
17.9	42.50 .30	61.1 1.1	55.10 .27	24.0 1.6	37.26 .57	50.9 0.7	3.43 .27	37.5 1.6
27.8	42.81 .31	62.3 1.3	55.38 .29	25.6 1.7	37.86 .62	50.4 -0.2	3.70 .28	39.1 1.7
July 7.8	43.13 .32	63.8 1.5	55.68 .30	27.4 1.7	38.50 .64	50.4 +0.2	4.00 .30	40.8 1.7
17.8	43.45 +22	65.3 +1.6	55.98 +20	29.1 +1.7	39.15 +65	50.8 +0.7	4.30 +20	42.5 +1.7
27.7	43.77 .31	67.0 1.7	56.28 .30	30.8 1.7	39.80 .65	51.7 1.1	4.60 .30	44.2 1.6
Aug. 6.7	44.08 .30	68.8 1.8	56.58 .28	32.5 1.6	40.45 .63	53.1 1.5	4.89 .22	45.8 1.5
16.7	44.37 .28	70.5 1.8	56.85 .27	34.0 1.4	41.07 .60	54.8 1.9	5.18 .27	47.2 1.4
26.7	44.64 .26	72.3 1.7	57.11 .25	35.3 1.2	41.65 .56	56.9 2.2	5.44 .25	48.6 1.2
Sept. 5.6	44.89 +22	73.9 +1.6	57.35 +22	36.5 +1.1	42.19 +51	59.2 +2.5	5.68 +22	49.7 +1.0
15.6	45.10 .20	75.5 1.5	57.55 .19	37.4 0.8	42.67 .45	61.9 2.7	5.90 .20	50.6 0.8
25.6	45.28 .17	77.0 1.4	57.73 .16	38.2 0.6	43.10 .39	64.7 2.9	6.09 .18	51.2 0.6
Oct. 5.6	45.44 .14	78.3 1.2	57.88 .13	38.7 0.4	43.45 .32	67.8 3.0	6.25 .15	51.7 0.4
15.5	45.55 .10	79.5 1.1	57.99 .10	39.0 +0.2	43.73 .24	70.9 2.1	6.38 .12	52.0 +0.1
25.5	45.64 +07	80.5 +0.2	58.08 +07	39.1 0.0	43.94 +16	74.0 +3.1	6.49 +08	52.0 0.0
Nov. 4.5	45.70 .04	81.3 0.7	58.13 .04	39.0 -0.1	44.06 +08	77.0 3.0	6.55 .06	51.9 -0.2
14.4	45.72 +01	82.0 0.6	58.16 +01	38.8 0.3	44.10 .00	80.1 2.9	6.60 +03	51.7 0.3
24.4	45.72 -02	82.4 0.4	58.16 -01	38.4 0.4	44.05 -09	82.9 2.7	6.61 .00	51.2 0.4
Dec. 4.4	45.68 .05	82.7 +0.2	58.13 .04	38.0 0.5	43.92 .17	85.4 2.4	6.59 -03	50.8 0.5
14.4	45.62 -06	82.9 0.0	58.08 -07	37.4 -0.6	43.71 -25	87.6 +2.0	6.55 -06	50.2 -0.6
24.3	45.53 .10	82.8 -0.2	58.00 .09	36.9 0.6	43.42 .32	89.5 1.6	6.48 .08	49.6 0.6
34.3	45.41 -13	82.6 -0.3	57.89 -11	36.2 -0.7	43.06 -38	90.8 +1.2	6.38 -11	49.0 -0.7



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Ceti.		$\alpha$ Ceti.		48 Cephei (H.)		$\zeta$ Arietis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 2 <sup>m</sup> 37	+ 2° 44'	<sup>h</sup> 2 <sup>m</sup> 56	+ 3° 38'	<sup>h</sup> 3 <sup>m</sup> 5	+ 77° 18'	<sup>h</sup> 3 <sup>m</sup> 8	+ 20° 36'
(Dec. 30.3)	21.42 -0.00	55.1 -0.8	17.10 -0.08	10.1 -0.8	51.92 -58	46.6 +2.1	18.80 -0.08	60.9 -0.1
Jan. 9.3	21.32 .12	55.4 0.7	17.01 .11	9.4 0.7	51.26 .71	48.4 1.6	18.71 .11	60.7 0.2
19.2	21.19 .13	54.6 0.7	16.89 .13	8.6 0.7	50.49 .81	49.8 1.0	18.59 .14	60.4 0.3
29.2	21.05 .15	54.0 0.6	16.74 .15	8.0 0.6	49.64 .88	50.5 +0.5	18.44 .16	60.0 0.4
Feb. 8.2	20.90 .15	53.5 0.5	16.59 .16	7.5 0.5	48.73 .91	50.7 -0.1	18.27 .17	59.5 0.5
18.2	20.74 -15	53.0 -0.4	16.43 -16	7.0 -0.4	47.81 -90	50.3 -0.7	18.10 -17	58.9 -0.6
28.2	20.59 .14	52.7 0.2	16.27 .15	6.7 0.3	46.92 .86	49.3 1.3	17.92 .17	58.3 0.6
Mar. 10.1	20.45 .13	52.6 -0.1	16.12 .14	6.5 -0.1	46.10 .77	47.7 1.8	17.76 .15	57.7 0.7
20.1	20.34 .10	52.6 +0.1	16.00 .11	6.5 +0.1	45.38 .65	45.8 2.2	17.62 .13	57.0 0.6
30.1	20.26 .07	52.8 0.3	15.90 .08	6.7 0.2	44.80 .50	43.4 2.5	17.50 .10	56.4 0.6
Apr. 9.1	20.21 -0.03	53.2 +0.5	15.83 -0.04	7.0 +0.4	44.38 -33	40.8 -2.2	17.43 -0.06	55.9 -0.6
19.0	20.20 +0.02	53.8 0.7	15.81 .00	7.5 0.6	44.13 -15	38.0 2.8	17.39 -0.1	55.4 0.3
29.0	20.24 .06	54.6 0.9	15.83 +0.0	8.3 0.9	44.07 +0.4	35.1 2.8	17.41 +0.4	55.2 -0.2
May 9.0	20.32 .11	55.7 1.1	15.89 .09	9.2 1.0	44.21 .33	32.3 2.7	17.47 .09	55.1 0.0
19.0	20.45 .15	56.9 1.3	16.01 .13	10.4 1.2	44.53 .41	29.6 2.6	17.58 .13	55.2 +0.2
28.9	20.62 +1.19	58.3 +1.5	16.16 +1.7	11.7 +1.4	45.02 +5.7	27.2 -2.3	17.74 +1.8	55.5 +0.4
June 7.9	20.83 .28	59.9 1.6	16.35 .21	13.1 1.5	45.68 .78	25.1 2.0	17.94 .22	56.1 0.6
17.9	21.07 .25	61.6 1.7	16.58 .24	14.8 1.6	46.47 .85	23.3 1.6	18.18 .25	56.8 0.8
27.8	21.33 .27	63.4 1.8	16.84 .27	16.5 1.7	47.38 .96	21.9 1.2	18.44 .28	57.8 1.0
July 7.8	21.62 .29	65.1 1.8	17.11 .28	18.2 1.7	48.38 1.04	21.0 0.7	18.74 .30	58.9 1.2
17.8	21.91 +1.29	66.9 +1.7	17.40 +1.29	19.9 +1.7	49.46 1.09	20.5 -0.2	19.04 +1.31	60.1 +1.3
27.7	22.21 .29	68.6 1.6	17.70 .29	21.5 1.6	50.57 1.12	20.6 +0.3	19.35 .31	61.4 1.3
Aug. 6.7	22.50 .29	70.1 1.5	17.99 .29	23.0 1.4	51.70 1.13	21.1 0.7	19.66 .31	62.7 1.4
16.7	22.78 .28	71.5 1.3	18.28 .28	24.4 1.3	52.82 1.10	22.0 1.2	19.97 .30	64.1 1.3
26.7	23.05 .26	72.6 1.0	18.55 .27	25.5 1.0	53.92 1.07	23.4 1.6	20.27 .29	65.4 1.3
Sept. 5.6	23.30 +1.24	73.6 +0.8	18.81 +1.25	26.4 +0.8	54.96 1.01	25.2 +2.0	20.55 +1.27	66.7 +1.2
15.6	23.52 .21	74.2 0.6	19.05 .23	27.1 0.5	55.94 .94	27.4 2.3	20.81 .25	67.9 1.1
25.6	23.72 .19	74.6 +0.3	19.26 .20	27.5 0.3	56.84 .85	29.9 2.6	21.05 .23	68.9 1.0
Oct. 5.6	23.90 .16	74.8 0.0	19.45 .17	27.7 +0.1	57.63 .73	32.7 2.9	21.26 .20	69.9 0.9
15.5	24.04 .13	74.7 -0.2	19.61 .15	27.7 -0.2	58.30 .61	35.7 3.1	21.46 .17	70.7 0.7
25.5	24.15 +1.10	74.4 -0.4	19.74 +1.12	27.4 -0.4	58.85 +4.7	38.9 +3.2	21.61 +1.14	71.4 +0.6
Nov. 4.5	24.24 .07	73.9 0.5	19.85 .09	27.0 0.5	59.24 .32	42.2 3.3	21.74 .11	71.9 0.5
14.4	24.29 .04	73.3 0.6	19.92 .06	26.4 0.6	59.49 +1.6	45.5 3.3	21.83 .08	72.3 0.4
24.4	24.32 +0.1	72.6 0.7	19.97 +0.3	25.6 0.7	59.56 -0.1	48.8 3.2	21.90 .05	72.7 0.3
Dec. 4.4	24.31 -0.02	71.8 0.8	19.98 .00	24.9 0.8	59.47 .18	51.9 3.0	21.93 +0.1	72.9 +0.2
14.4	24.28 -0.05	71.0 -0.8	19.96 -0.03	24.1 -0.8	59.21 -34	54.8 +2.8	21.92 -0.02	73.0 0.0
24.3	24.21 .07	70.2 0.8	19.91 .06	23.3 0.8	58.78 .50	57.4 2.6	21.88 .06	72.9 -0.1
34.3	24.12 -1.10	69.4 -0.8	19.83 -1.10	22.5 -0.8	58.20 -65	59.5 +2.4	21.80 -1.10	72.8 -0.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Persei.		$\epsilon$ Eridani.		$\delta$ Persei.		$\eta$ Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 3 16	+49° 26'	<sup>h</sup> <sup>m</sup> 3 27	— 9° 50'	<sup>h</sup> <sup>m</sup> 3 34	+47° 24'	<sup>h</sup> <sup>m</sup> 3 40	+23° 44'
(Dec. 30.4)	<sup>s</sup> 9.10 —.13	67.3 +1.1	<sup>s</sup> 31.80 —.08	63.8 —1.3	<sup>s</sup> 46.51 —.10	69.8 +1.1	<sup>s</sup> 40.39 —.04	51.9 0.0
Jan. 9.3	8.94 .18	68.3 0.8	31.71 .11	65.0 1.1	46.38 .15	70.8 0.9	40.32 .09	51.9 0.0
19.3	8.74 .28	68.9 0.4	31.59 .13	66.0 0.9	46.21 .19	71.5 0.5	40.21 .13	51.8 —0.2
29.3	8.51 .25	69.1 +0.1	31.44 .15	66.9 0.7	45.99 .23	71.8 +0.2	40.06 .15	51.6 0.3
Feb. 8.2	8.25 .27	69.0 —0.3	31.28 .16	67.5 0.5	45.75 .25	71.9 —0.2	39.90 .17	51.3 0.4
18.2	7.97 —.27	68.5 —0.7	31.10 —.17	67.8 —0.2	45.49 —.26	71.5 —0.5	39.71 —.18	50.9 —0.5
28.2	7.70 .26	67.6 1.0	30.93 .17	67.9 +0.1	45.22 .26	70.8 0.8	39.53 .18	50.4 0.5
Mar. 10.2	7.45 .24	66.4 1.3	30.76 .16	67.7 0.4	44.97 .24	69.8 1.1	39.35 .17	49.8 0.6
20.1	7.22 .20	64.9 1.6	30.60 .14	67.3 0.7	44.74 .21	68.6 1.4	39.18 .15	49.1 0.6
30.1	7.04 .16	63.3 1.7	30.47 .12	66.6 0.9	44.55 .17	67.1 1.5	39.04 .12	48.5 0.6
Apr. 9.1	6.91 —.10	61.5 —1.8	30.37 —.08	65.6 +1.1	44.41 —.11	65.5 —1.6	38.93 —.09	47.9 —0.6
19.1	6.84 —.04	59.6 1.8	30.31 —.04	64.4 1.3	44.32 —.05	63.8 1.7	38.87 —.04	47.4 0.5
29.0	6.84 +.03	57.8 1.8	30.29 .00	63.0 1.5	44.30 +.01	62.1 1.6	38.85 +.01	46.9 0.4
May 9.0	6.91 .10	56.1 1.6	30.32 +.05	61.3 1.7	44.34 .07	60.5 1.5	38.88 .06	46.6 —0.2
19.0	7.05 .17	54.6 1.4	30.39 .09	59.5 1.9	44.45 .14	59.1 1.4	38.96 .11	46.5 0.0
28.9	7.25 +.23	53.3 —1.2	30.50 +.14	57.5 +2.0	44.62 +.22	57.8 —1.2	39.09 +.15	46.5 +0.1
June 7.9	7.51 .26	52.3 0.9	30.66 .18	55.4 2.1	44.85 .26	56.7 0.9	39.27 .20	46.7 0.3
17.9	7.82 .33	51.5 0.6	30.86 .21	53.3 2.1	45.13 .30	56.0 0.6	39.49 .23	47.2 0.5
27.9	8.17 .37	51.1 —0.3	31.09 .24	51.2 2.1	45.46 .34	55.5 —0.3	39.74 .26	47.8 0.7
July 7.8	8.56 .40	51.0 +0.1	31.34 .26	49.1 2.0	45.82 .37	55.3 0.0	40.01 .29	48.6 0.8
17.8	8.97 +.42	51.3 +0.4	31.61 +.28	47.1 +1.9	46.21 +.40	55.4 +0.3	40.31 +.30	49.5 +1.0
27.8	9.39 .43	51.8 0.7	31.89 .29	45.4 1.7	46.61 .41	55.8 0.5	40.62 .31	50.5 1.1
Aug. 6.8	9.82 .42	52.7 1.0	32.18 .29	43.8 1.4	47.02 .41	56.5 0.8	40.94 .32	51.6 1.1
16.7	10.24 .42	53.9 1.3	32.47 .26	42.5 1.1	47.43 .41	57.4 1.0	41.26 .31	52.7 1.2
26.7	10.66 .40	55.2 1.5	32.75 .27	41.5 0.8	47.84 .40	58.6 1.3	41.57 .30	53.9 1.1
Sept. 5.7	11.05 +.38	56.8 +1.7	33.02 +.26	40.9 +0.5	48.23 +.38	60.0 +1.5	41.87 +.29	55.0 +1.1
15.6	11.42 .35	58.6 1.8	33.27 .24	40.7 +0.1	48.60 .36	61.5 1.6	42.15 .26	56.1 1.0
25.6	11.76 .32	60.5 2.0	33.50 .22	40.8 —0.2	48.94 .33	63.2 1.7	42.42 .26	57.1 1.0
Oct. 5.6	12.06 .29	62.5 2.1	33.71 .20	41.2 0.6	49.26 .30	65.0 1.8	42.66 .23	58.0 0.9
15.6	12.33 .25	64.7 2.1	33.90 .17	42.0 0.9	49.55 .27	66.9 1.9	42.88 .21	58.8 0.8
25.5	12.56 +.21	66.8 +2.1	34.05 +.14	43.1 —1.1	49.80 +.23	68.8 +1.9	43.08 +.18	59.5 +0.7
Nov. 4.5	12.75 .16	68.9 2.1	34.18 .11	44.4 1.3	50.00 .18	70.8 1.9	43.24 .15	60.1 0.6
14.5	12.89 .11	71.1 2.0	34.27 .08	45.8 1.5	50.16 .14	72.7 1.9	43.38 .12	60.7 0.5
24.5	12.97 .06	73.1 1.9	34.33 .05	47.4 1.6	50.28 .09	74.6 1.8	43.48 .06	61.1 0.4
Dec. 4.4	13.01 +.01	74.9 1.8	34.36 +.01	49.0 1.6	50.34 +.04	76.3 1.7	43.54 .05	61.5 0.3
14.4	12.99 —.05	76.6 +1.6	34.36 —.02	50.5 —1.5	50.35 —.02	78.0 +1.6	43.57 +.01	61.7 +0.2
24.4	12.92 .10	78.1 1.3	34.32 .05	51.9 1.4	50.31 .07	79.4 1.3	43.56 —.03	61.9 +0.1
34.4	12.79 —.15	79.3 +1.0	34.25 —.06	53.3 —1.3	50.21 —.12	80.6 +1.1	43.50 —.07	62.0 0.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\zeta$ Persei.		$\gamma$ Eridani.		$\gamma$ Tauri.		$\epsilon$ Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 3 46	+31° 32'	<sup>h</sup> <sup>m</sup> 3 52	-13° 49'	<sup>h</sup> <sup>m</sup> 4 13	+15° 20'	<sup>h</sup> <sup>m</sup> 4 21	+18° 55'
(Dec. 30.4)	<sup>s</sup> 55.90 -0.04	26.1 +0.5	<sup>s</sup> 41.04 -0.08	83.3 -1.6	<sup>s</sup> 16.41 -0.03	50.0 -0.3	<sup>s</sup> 55.62 -0.02	21.5 -0.1
Jan. 9.3	55.82 .10	26.5 0.3	40.96 .10	84.8 1.4	16.36 .07	49.6 0.3	55.58 .06	21.4 0.2
19.3	55.70 .14	26.7 +0.1	40.85 .13	86.1 1.1	16.28 .10	49.3 0.3	55.50 .10	21.2 0.2
29.3	55.55 .17	26.7 -0.1	40.70 .15	87.1 0.9	16.16 .13	48.9 0.3	55.38 .13	21.0 0.2
Feb. 8.3	55.37 .19	26.5 0.2	40.54 .17	87.8 0.6	16.01 .16	48.6 0.3	55.23 .16	20.7 0.3
18.2	55.17 -.20	26.2 -0.4	40.36 -.18	88.2 -0.3	15.84 -.18	48.3 -0.3	55.06 -.18	20.4 -0.3
28.2	54.97 .20	25.7 0.6	40.17 .18	88.3 0.0	15.66 .18	47.9 0.3	54.87 .19	20.1 0.3
Mar. 10.2	54.77 .19	25.0 0.7	39.99 .18	88.1 +0.3	15.47 .18	47.6 0.3	54.69 .18	19.8 0.3
20.2	54.58 .17	24.2 0.8	39.82 .16	87.7 0.6	15.30 .16	47.3 0.3	54.51 .17	19.4 0.3
30.1	54.43 .14	23.3 0.9	39.67 .14	86.9 0.9	15.15 .14	47.0 0.2	54.35 .15	19.1 0.3
Apr. 9.1	54.31 -.10	22.4 -0.9	39.55 -.10	85.9 +1.2	15.02 -.11	46.8 -0.1	54.21 -.12	18.8 -0.3
19.1	54.23 -.05	21.5 0.9	39.46 .06	84.6 1.4	14.94 .07	46.7 0.0	54.12 .08	18.5 0.2
29.0	54.21 .00	20.6 0.8	39.42 -.02	83.0 1.7	14.89 -.02	46.8 +0.1	54.06 -.03	18.4 -0.1
May 9.0	54.23 +0.5	19.8 0.7	39.42 +0.2	81.2 1.9	14.89 +0.2	46.9 0.2	54.05 +0.2	18.3 0.0
19.0	54.31 .11	19.2 0.5	39.47 .07	79.3 2.0	14.93 .07	47.2 0.4	54.09 .06	18.4 +0.2
29.0	54.45 +1.6	18.8 -0.3	39.56 +1.1	77.2 +2.2	15.03 +1.1	47.7 +0.5	54.18 +1.1	18.6 +0.3
June 7.9	54.63 .20	18.6 -0.1	39.69 .15	75.0 2.2	15.16 .16	48.3 0.7	54.31 .15	19.0 0.4
17.9	54.85 .24	18.5 +0.1	39.87 .19	72.7 2.3	15.34 .20	49.0 0.8	54.49 .19	19.5 0.6
27.9	55.11 .27	18.7 0.3	40.08 .22	70.4 2.2	15.55 .23	49.9 0.9	54.70 .23	20.2 0.7
July 7.9	55.40 .30	19.1 0.5	40.32 .25	68.2 2.1	15.80 .25	50.9 1.0	54.94 .25	20.9 0.8
17.8	55.72 +.22	19.7 +0.7	40.58 +.27	66.1 +2.0	16.06 +.27	51.9 +1.1	55.20 +.26	21.8 +0.9
27.8	56.05 .33	20.5 0.8	40.86 .28	64.2 1.8	16.35 .29	53.0 1.1	55.49 .29	22.7 0.9
Aug. 6.8	56.38 .34	21.4 0.9	41.14 .29	62.6 1.5	16.64 .30	54.1 1.1	55.79 .30	23.6 0.9
16.7	56.72 .34	22.4 1.0	41.43 .29	61.3 1.1	16.94 .30	55.1 1.0	56.09 .30	24.6 0.9
26.7	57.05 .33	23.5 1.1	41.72 .28	60.3 0.8	17.24 .29	56.1 0.9	56.39 .30	25.5 0.9
Sept. 5.7	57.37 +.31	24.6 +1.2	42.00 +.27	59.7 +0.4	17.53 +.29	57.0 +0.8	56.69 +.30	26.3 +0.8
15.7	57.68 .30	25.8 1.2	42.26 .26	59.5 0.0	17.81 .28	57.7 0.7	56.98 .29	27.0 0.7
25.6	57.97 .28	27.0 1.2	42.51 .24	59.8 -0.4	18.08 .26	58.3 0.5	57.26 .27	27.6 0.6
Oct. 5.6	58.24 .25	28.1 1.1	42.74 .22	60.4 0.8	18.34 .25	58.7 0.4	57.53 .26	28.1 0.4
15.6	58.48 .23	29.2 1.1	42.95 .19	61.3 1.1	18.57 .22	59.0 0.2	57.77 .24	28.5 0.3
25.6	58.69 +.20	30.3 +1.1	43.13 +.17	62.6 -1.4	18.78 +.20	59.1 +0.1	58.00 +.21	28.8 +0.2
Nov. 4.5	58.88 .17	31.4 1.0	43.28 .14	64.1 1.6	18.97 .17	59.1 0.0	58.20 .19	29.0 +0.1
14.5	59.03 .13	32.4 0.9	43.40 .10	65.8 1.8	19.13 .14	59.0 -0.1	58.37 .16	29.0 0.0
24.5	59.14 .09	33.3 0.9	43.49 .07	67.6 1.8	19.26 .11	58.9 0.2	58.51 .12	29.1 0.0
Dec. 4.4	59.22 .05	34.1 0.8	43.54 +0.3	69.5 1.8	19.35 .08	58.6 0.2	58.62 .09	29.0 0.0
14.4	59.25 +0.1	34.8 +0.7	43.56 .00	71.3 -1.7	19.41 +0.4	58.4 -0.3	58.68 +0.5	29.0 -0.1
24.4	59.24 -0.3	35.5 0.6	43.53 -0.4	73.1 1.6	19.43 .00	58.1 0.3	58.71 .00	28.9 0.1
34.4	59.19 -0.8	36.0 +0.4	43.48 -0.7	74.6 -1.5	19.40 -0.4	57.8 -0.3	58.70 -0.4	28.8 -0.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Tauri. (Aldebaran.)		$\alpha$ Camelopardalis.		$\epsilon$ Aurigæ.		$\iota$ Orionis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 4 <sup>m</sup> 29	+16° 16'	<sup>h</sup> 4 <sup>m</sup> 42	+66° 8'	<sup>h</sup> 4 <sup>m</sup> 49	+32° 58'	<sup>h</sup> 4 <sup>m</sup> 57	+15° 14'
(Dec. 30.4)	<sup>s</sup> 20.83 -0.01	30.6 -0.3	<sup>s</sup> 41.02 -0.08	43.1 +2.3	<sup>s</sup> 32.14 .00	53.0 +0.7	<sup>s</sup> 61.41 +0.01	26.0 -0.4
Jan. 9.4	20.80 .06	30.3 0.3	40.89 .18	45.4 2.1	32.12 -0.05	53.6 0.6	61.40 -0.03	25.7 0.3
19.4	20.72 .10	30.0 0.3	40.66 .37	47.3 1.8	32.05 .10	54.2 0.5	61.34 .07	25.3 0.3
29.3	20.61 .13	29.7 0.3	40.34 .35	48.9 1.4	31.93 .14	54.6 0.3	61.25 .11	25.1 0.3
Feb. 8.3	20.46 .16	29.4 0.3	39.95 .42	50.0 0.9	31.77 .17	54.8 +0.3	61.12 .14	24.8 0.3
18.3	20.30 -0.17	29.1 -0.3	39.51 -0.46	50.7 +0.5	31.58 -0.20	54.9 0.0	60.96 -0.17	24.6 -0.3
28.2	20.11 .18	28.8 0.3	39.03 .48	50.9 0.0	31.37 .21	54.8 -0.3	60.78 .18	24.3 0.2
Mar. 10.2	19.93 .18	28.5 0.3	38.54 .48	50.6 -0.5	31.16 .21	54.6 0.3	60.59 .19	24.1 0.2
20.2	19.75 .17	28.3 0.3	38.07 .45	49.8 1.0	30.94 .20	54.2 0.5	60.41 .18	23.9 0.2
30.2	19.59 .15	28.0 0.2	37.64 .40	48.6 1.4	30.75 .18	53.6 0.6	60.23 .16	23.8 0.1
Apr. 9.1	19.45 -0.12	27.8 -0.2	37.27 -0.34	47.1 -1.7	30.58 -0.15	52.9 -0.7	60.06 -0.14	23.7 -0.1
19.1	19.35 .08	27.7 -0.1	36.97 .36	45.2 2.0	30.45 .11	52.1 0.8	59.96 .10	23.7 0.0
29.1	19.29 -0.04	27.7 0.0	36.75 .16	43.0 2.2	30.36 .06	51.3 0.8	59.88 .06	23.7 +0.1
May 9.1	19.27 +0.01	27.7 +0.2	36.64 -0.06	40.7 2.3	30.32 -0.01	50.6 0.8	59.83 -0.02	23.8 0.2
19.0	19.30 .06	28.0 0.3	36.63 +0.04	38.4 2.3	30.34 +0.04	49.8 0.7	59.84 +0.03	24.1 0.3
29.0	19.38 +0.10	28.3 +0.4	36.73 +0.15	36.0 -2.3	30.40 +0.09	49.2 -0.6	59.89 +0.07	24.5 +0.4
June 8.0	19.50 .14	28.8 0.6	36.93 .34	33.8 2.3	30.52 .14	48.6 0.5	59.98 .12	24.9 0.5
17.9	19.67 .18	29.5 0.7	37.22 .33	31.7 2.0	30.69 .19	48.2 0.3	60.12 .16	25.5 0.6
27.9	19.67 .22	30.2 0.8	37.60 .42	29.8 1.8	30.90 .23	48.0 -0.2	60.30 .19	26.2 0.7
July 7.9	20.10 .25	31.1 0.9	38.05 .49	28.2 1.5	31.14 .26	47.9 0.0	60.51 .22	27.0 0.8
17.9	20.36 +0.27	32.0 +0.9	38.57 +0.54	26.9 -1.1	31.42 +0.29	47.9 +0.1	60.74 +0.25	27.9 +0.8
27.8	20.63 .28	33.0 1.0	39.14 .59	25.9 0.8	31.72 .31	48.1 0.2	61.00 .27	28.7 0.9
Aug. 6.8	20.92 .29	33.9 1.0	39.75 .62	25.3 0.5	32.04 .22	48.4 0.4	61.28 .28	29.6 0.8
16.8	21.22 .30	34.9 0.9	40.39 .65	25.0 -0.1	32.37 .23	48.9 0.5	61.56 .29	30.4 0.8
26.8	21.52 .30	35.7 0.8	41.05 .66	25.1 +0.3	32.71 .24	49.4 0.5	61.86 .29	31.1 0.7
Sept. 5.7	21.81 +0.29	36.5 +0.7	41.71 +0.68	25.5 +0.6	33.05 +0.24	50.0 +0.6	62.15 +0.29	31.7 +0.6
15.7	22.10 .28	37.2 0.6	42.36 .64	26.3 0.9	33.38 .23	50.6 0.7	62.44 .29	32.2 0.4
25.7	22.38 .27	37.7 0.4	43.00 .62	27.4 1.3	33.70 .22	51.3 0.7	62.73 .28	32.6 0.3
Oct. 5.6	22.65 .26	38.1 0.3	43.61 .59	28.9 1.6	34.02 .21	52.0 0.7	63.01 .27	32.8 +0.1
15.6	22.89 .24	38.3 +0.2	44.18 .55	30.6 1.8	34.32 .20	52.7 0.7	63.27 .25	32.8 0.0
25.6	23.12 +0.22	38.4 0.0	44.70 +0.50	32.6 +2.1	34.59 +0.26	53.4 +0.7	63.51 +0.24	32.8 -0.1
Nov. 4.6	23.32 .19	38.4 -0.1	45.17 .43	34.8 2.3	34.85 .24	54.1 0.8	63.74 .21	32.6 0.2
14.5	23.50 .16	38.3 0.1	45.57 .36	37.2 2.5	35.07 .21	54.9 0.8	63.94 .19	32.3 0.3
24.5	23.65 .13	38.1 0.2	45.89 .27	39.7 2.6	35.26 .17	55.7 0.8	64.12 .16	32.0 0.3
Dec. 4.5	23.76 .09	37.9 0.2	46.12 .18	42.3 2.6	35.41 .13	56.4 0.8	64.26 .19	31.6 0.4
14.5	23.83 +0.05	37.7 -0.2	46.25 +0.08	45.0 +2.6	35.51 +0.08	57.2 +0.7	64.36 +0.08	31.2 -0.4
24.4	23.86 +0.01	37.4 0.2	46.28 -0.02	47.5 2.5	35.57 +0.03	57.9 0.7	64.42 +0.04	30.9 0.2
34.4	23.85 -0.03	37.2 -0.2	46.21 -0.12	49.9 +2.3	35.58 -0.02	58.6 +0.7	64.43 .00	30.5 -0.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i><math>\alpha</math> Aurigæ. (Capella.)</i>		<i><math>\beta</math> Orionis. (Rigel.)</i>		<i><math>\beta</math> Tauri.</i>		Groombridge 966.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 5	<sup>m</sup> 8	<sup>h</sup> 5	<sup>m</sup> 9	<sup>h</sup> 5	<sup>m</sup> 19	<sup>h</sup> 5	<sup>m</sup> 24
		+45° 52'		— 8° 20'		+28° 30'		+74° 57'
(Dec. 30.4)	<sup>s</sup> 13.92	+0.08	<sup>s</sup> 2.11	.00	<sup>s</sup> 3.12	+0.08	<sup>s</sup> 27.44	—0.08
Jan. 9.4	13.90	—0.04	2.10	—0.04	3.13	—0.08	27.33	.19
	19.4	13.83 .11	2.04	.08	3.09	.07	27.05	.35
	29.4	13.69 .16	1.94	.12	3.00	.11	26.63	.40
Feb. 8.3	13.51	.30	1.81	.15	2.87	.15	26.07	.61
	18.3	13.28 —.34	1.65	—0.17	2.70	—0.18	25.41	—0.70
	28.3	13.03 .26	1.47	.18	2.51	.20	24.67	.76
Mar. 10.2	12.77	.37	1.28	.19	2.30	.21	23.90	.78
	20.2	12.50 .36	1.09	.18	2.09	.20	23.12	.76
	30.2	12.25 .34	0.91	.17	1.90	.19	22.37	.73
Apr. 9.2	12.03	—0.20	0.75	—0.15	1.72	—0.16	21.68	—0.64
	19.1	11.85 .16	0.61	.12	1.57	.13	21.09	.53
	29.1	11.72 .10	0.51	.08	1.47	.09	20.62	.41
May 9.1	11.64	—0.04	0.45	—0.04	1.40	—0.04	20.28	.27
	19.1	11.63 +0.02	0.43	.00	1.39	+0.01	20.09	—0.11
	29.0	11.68 +0.06	0.46	+0.05	1.42	+0.05	20.05	+0.04
June 8.0	11.79	.14	0.52	.00	1.51	.10	20.17	.19
	18.0	11.95 .19	0.63	.13	1.64	.15	20.43	.34
	27.9	12.17 .24	0.78	.16	1.81	.19	20.85	.47
July 7.9	12.44	.29	0.96	.20	2.02	.23	21.39	.60
	17.9	12.75 +0.22	1.17	+0.22	2.26	+0.26	22.05	+0.71
	27.9	13.09 .25	1.40	.24	2.53	.28	22.81	.80
Aug. 6.8	13.45	.37	1.66	.26	2.82	.30	23.11	.88
	16.8	13.83 .29	1.92	.27	3.13	.31	23.4	.93
	26.8	14.23 .40	2.20	.28	3.44	.31	23.8	.93
Sept. 5.8	14.63	+0.40	2.48	+0.28	3.76	+0.22	24.1	+0.4
	15.7	15.03 .40	2.75	.28	4.09	.22	24.5	.4
	25.7	15.42 .29	3.03	.27	4.41	.22	24.8	.3
Oct. 5.7	15.81	.28	3.30	.26	4.72	.21	25.2	.3
	15.6	16.18 .26	3.55	.25	5.02	.20	25.5	.3
	25.6	16.52 +0.23	3.79	+0.23	5.31	+0.22	25.8	+0.3
Nov. 4.6	16.84	.20	4.01	.21	5.58	.25	26.1	.3
	14.6	17.13 .26	4.20	.18	5.82	.23	26.5	.3
	24.5	17.37 .22	4.36	.15	6.03	.20	26.8	.4
Dec. 4.5	17.57	.17	4.50	.11	6.21	.16	27.2	.4
	14.5	17.71 +0.12	4.59	+0.07	6.34	+0.11	27.6	+0.4
	24.5	17.80 +0.06	4.64	+0.03	6.43	.06	28.0	.4
	34.4	17.82 .00	4.65	—0.01	6.47	+0.01	28.4	+0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Orionis.		$\alpha$ Leporis.		$\epsilon$ Orionis.		$\alpha$ Columbæ.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 5 <sup>m</sup> 26	<sup>°</sup> — 0 <sup>'</sup> 23	<sup>h</sup> 5 <sup>m</sup> 27	<sup>°</sup> — 17 <sup>'</sup> 54	<sup>h</sup> 5 <sup>m</sup> 30	<sup>°</sup> — 1 <sup>'</sup> 16	<sup>h</sup> 5 <sup>m</sup> 35	<sup>°</sup> — 34 <sup>'</sup> 8
(Dec. 30.4)	<sup>s</sup> 9.39 +.03	<sup>"</sup> 17.9 — 1.3	<sup>s</sup> 41.00 +.01	<sup>"</sup> 32.3 — 2.3	<sup>s</sup> 24.18 +.03	<sup>"</sup> 45.8 — 1.4	<sup>s</sup> 30.83 —.01	<sup>"</sup> 23.8 — 2.8
Jan. 9.4	9.40 —.02	19.1 1.2	41.00 —.03	34.4 2.0	24.19 —.01	47.1 1.2	30.80 .06	26.5 2.6
19.4	9.36 .06	20.2 1.0	40.94 .08	36.2 1.7	24.16 .06	48.3 1.1	30.72 .11	29.0 2.3
29.4	9.28 .10	21.1 0.8	40.84 .12	37.8 1.5	24.08 .10	49.3 0.9	30.58 .15	31.1 1.9
Feb. 8.3	9.16 .13	21.9 0.7	40.70 .15	39.1 1.1	23.96 .13	50.1 0.7	30.41 .19	32.8 1.5
18.3	9.01 —.16	22.5 — 0.5	40.54 —.18	40.1 — 0.8	23.82 —.16	50.7 — 0.5	30.21 —.22	34.2 — 1.1
28.3	8.84 .18	22.9 0.3	40.35 .20	40.8 0.5	23.64 .18	51.1 0.3	29.98 .24	35.0 0.6
Mar. 10.3	8.65 .18	23.1 — 0.1	40.14 .20	41.1 — 0.1	23.46 .19	51.4 — 0.1	29.73 .25	35.5 — 0.2
20.2	8.47 .18	23.1 0.0	39.94 .20	41.0 + 0.2	23.27 .18	51.4 + 0.1	29.48 .25	35.4 + 0.3
30.2	8.29 .17	23.0 + 0.2	39.74 .19	40.7 0.5	23.09 .17	51.3 0.2	29.23 .24	34.9 0.7
Apr. 9.2	8.12 —.15	22.7 + 0.4	39.56 —.17	40.0 + 0.9	22.93 —.15	50.9 + 0.4	29.01 —.21	34.0 + 1.1
19.1	7.99 .12	22.2 0.6	39.40 .14	38.9 1.1	22.79 .12	50.4 0.6	28.81 .18	32.7 1.5
29.1	7.88 .09	21.5 0.8	39.28 .11	37.7 1.4	22.68 .09	49.7 0.8	28.64 .15	31.0 1.9
May 9.1	7.81 .05	20.6 0.9	39.19 .06	36.1 1.7	22.61 .05	48.8 1.0	28.51 .10	29.0 2.2
19.1	7.79 —.01	19.6 1.1	39.14 —.02	34.3 1.9	22.57 —.01	47.7 1.1	28.43 .06	26.6 2.5
29.0	7.80 +.04	18.4 + 1.2	39.14 +.02	32.3 + 2.1	22.59 +.03	46.5 + 1.3	28.39 —.01	24.1 + 2.7
June 8.0	7.86 .08	17.1 1.4	39.18 .06	30.1 2.2	22.64 .07	45.2 1.4	28.41 +.04	21.3 2.8
18.0	7.96 .12	15.7 1.4	39.27 .10	27.8 2.3	22.73 .11	43.7 1.5	28.47 .08	18.4 2.9
28.0	8.10 .15	14.2 1.5	39.39 .14	25.5 2.3	22.87 .15	42.2 1.5	28.57 .13	15.5 2.9
July 7.9	8.27 .19	12.7 1.5	39.55 .18	23.2 2.3	23.03 .18	40.7 1.5	28.72 .17	12.6 2.8
17.9	8.47 +.21	11.2 + 1.5	39.75 +.21	20.9 + 2.2	23.23 +.21	39.2 + 1.5	28.91 +.21	9.8 + 2.7
27.9	8.69 .23	9.8 1.4	39.97 .23	18.8 2.0	23.45 .23	37.7 1.4	29.14 .24	7.3 2.4
Aug. 6.8	8.94 .25	8.5 1.2	40.21 .25	17.0 1.7	23.69 .25	36.4 1.2	29.39 .26	5.0 2.1
16.8	9.20 .27	7.4 1.0	40.47 .27	15.4 1.4	23.95 .26	35.3 1.0	29.66 .28	3.1 1.7
26.8	9.47 .27	6.5 0.8	40.74 .28	14.2 1.0	24.22 .27	34.3 0.8	29.96 .30	1.6 1.2
Sept. 5.8	9.75 +.28	5.8 + 0.5	41.02 +.28	13.3 + 0.6	24.50 +.28	33.6 + 0.5	30.26 +.31	0.6 + 0.7
15.7	10.02 .28	5.4 + 0.2	41.31 .28	13.0 + 0.2	24.78 .28	33.3 + 0.2	30.58 .31	0.1 + 0.2
25.7	10.30 .28	5.3 — 0.1	41.59 .28	13.0 — 0.2	25.05 .27	33.2 — 0.1	30.89 .31	0.2 — 0.4
Oct. 5.7	10.57 .27	5.5 0.4	41.87 .27	13.5 0.7	25.33 .27	33.4 0.4	31.20 .30	0.9 0.9
15.7	10.84 .26	6.0 0.6	42.14 .26	14.4 1.1	25.59 .26	33.9 0.7	31.49 .29	2.1 1.4
25.6	11.09 +.24	6.8 — 0.9	42.39 +.24	15.7 — 1.5	25.84 +.24	34.8 — 0.9	31.77 +.27	3.8 — 1.9
Nov. 4.6	11.32 .22	7.8 1.1	42.62 .22	17.4 1.8	26.08 .22	35.8 1.1	32.02 .24	5.9 2.3
14.6	11.53 .20	9.0 1.2	42.83 .19	19.3 2.1	26.29 .20	37.0 1.3	32.25 .21	8.5 2.6
24.5	11.72 .17	10.3 1.3	43.01 .16	21.5 2.2	26.48 .17	38.4 1.4	32.44 .17	11.2 2.9
Dec. 4.5	11.87 .13	11.7 1.4	43.15 .13	23.8 2.3	26.64 .14	39.8 1.4	32.58 .12	14.1 3.0
14.5	11.99 +.10	13.1 — 1.4	43.26 +.09	26.1 — 2.3	26.76 +.10	41.3 — 1.4	32.69 +.08	17.1 — 3.0
24.5	12.06 .06	14.4 1.3	43.32 +.04	28.4 2.2	26.84 .06	42.7 1.4	32.74 +.03	20.1 2.9
34.4	12.10 +.02	15.7 — 1.2	43.34 —.01	30.5 — 2.0	26.87 +.02	44.0 — 1.3	32.74 —.03	23.0 — 2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Orionis.		$\gamma$ Orionis.		22 Camelop. (H.)		$\mu$ Geminorum.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 5 48	+ 7° 22'	<sup>h</sup> <sup>m</sup> 6 1	+ 14° 46'	<sup>h</sup> <sup>m</sup> 6 6	+ 69° 21'	<sup>h</sup> <sup>m</sup> 6 16	+ 22° 34'
(Dec. 30.5)	<sup>s</sup> 58.31 +.05	53.8 -0.9	<sup>s</sup> 2.02 +.07	41.5 -0.5	<sup>s</sup> 14.32 +.13	21.3 +2.6	<sup>s</sup> 1.90 +.00	6.6 0.0
Jan. 9.5	58.34 +.01	53.0 0.8	2.07 +.02	41.1 0.4	14.38 -.01	23.9 2.6	1.97 +.04	6.6 0.0
19.4	58.32 -.04	52.2 0.7	2.06 -.02	40.7 0.3	14.30 .14	26.4 2.4	1.98 -.01	6.7 +0.1
29.4	58.26 .08	51.6 0.6	2.02 .07	40.4 0.2	14.10 .25	28.7 2.2	1.94 .06	6.8 0.2
Feb. 8.4	58.16 .12	51.1 0.4	1.92 .11	40.2 0.2	13.79 .36	30.7 1.9	1.86 .11	7.0 0.2
18.4	58.03 -.14	50.7 -0.3	1.79 -.13	40.1 -0.1	13.38 -.45	32.4 +1.5	1.73 -.14	7.2 +0.2
28.3	57.87 .17	50.4 0.2	1.63 .17	40.0 -0.1	12.90 .51	33.7 1.0	1.57 .17	7.4 0.2
Mar. 10.3	57.69 .18	50.2 -0.1	1.45 .18	40.0 0.0	12.36 .55	34.5 +0.5	1.39 .19	7.5 0.1
20.3	57.50 .19	50.2 0.0	1.26 .19	40.0 0.0	11.80 .56	34.8 0.0	1.20 .20	7.6 +0.1
30.3	57.32 .18	50.2 +0.1	1.08 .18	40.0 0.0	11.24 .55	34.6 -0.4	1.00 .19	7.6 0.0
Apr. 9.2	57.15 -.16	50.4 +0.2	0.90 -.17	40.0 +0.1	10.71 -.51	33.9 -0.9	0.81 -.18	7.6 0.0
19.2	57.00 .13	50.6 0.3	0.74 .14	40.1 0.1	10.23 .44	32.7 1.3	0.64 .15	7.5 -0.1
29.2	56.88 .10	51.0 0.4	0.62 .11	40.2 0.2	9.82 .36	31.2 1.7	0.51 .12	7.4 0.1
May 9.2	56.80 .06	51.5 0.5	0.53 .07	40.4 0.2	9.50 .27	29.3 2.0	0.40 .08	7.3 0.1
19.1	56.76 -.02	52.1 0.7	0.48 -.02	40.6 0.3	9.28 .16	27.2 2.2	0.34 -.04	7.2 0.1
29.1	56.76 +.02	52.8 +0.8	0.48 +.02	40.9 +0.4	9.17 -.05	24.9 -2.4	0.32 .00	7.1 -0.1
June 8.1	56.80 .06	53.6 0.9	0.51 .06	41.3 0.4	9.17 +.06	22.4 2.4	0.35 +.05	7.0 -0.1
18.0	56.89 .10	54.6 0.9	0.59 .10	41.8 0.5	9.28 .17	20.0 2.5	0.42 .09	7.0 0.0
28.0	57.01 .14	55.5 1.0	0.71 .14	42.3 0.5	9.51 .27	17.5 2.4	0.53 .13	7.0 0.0
July 8.0	57.17 .17	56.6 1.0	0.86 .17	42.9 0.6	9.83 .37	15.2 2.3	0.67 .16	7.1 +0.1
18.0	57.36 +.20	57.6 +1.0	1.05 +.20	43.5 +0.6	10.24 +.46	13.0 -2.1	0.86 +.20	7.2 +0.1
27.9	57.57 .23	58.6 1.0	1.26 .23	44.1 0.6	10.74 .53	11.0 1.9	1.07 .22	7.3 0.1
Aug. 6.9	57.81 .24	59.5 0.9	1.50 .25	44.6 0.5	11.31 .60	9.2 1.6	1.31 .25	7.4 0.1
16.9	58.06 .26	60.4 0.8	1.75 .26	45.1 0.5	11.95 .66	7.8 1.3	1.57 .27	7.5 0.1
26.8	58.33 .27	61.1 0.6	2.02 .28	45.6 0.4	12.63 .70	6.6 1.0	1.84 .28	7.6 +0.1
Sept. 5.8	58.61 +.28	61.6 +0.4	2.31 +.28	45.9 +0.2	13.35 +.73	5.7 -0.7	2.13 +.29	7.6 0.0
15.8	58.89 .28	61.9 +0.2	2.60 .29	46.0 +0.1	14.09 .75	5.2 -0.3	2.43 .30	7.6 -0.1
25.8	59.17 .28	61.9 0.0	2.89 .29	46.1 -0.1	14.85 .76	5.1 0.0	2.74 .31	7.5 0.1
Oct. 5.7	59.45 .28	61.8 -0.3	3.18 .29	45.9 0.2	15.61 .74	5.3 +0.4	3.05 .31	7.3 0.2
15.7	59.73 .27	61.4 0.5	3.47 .29	45.6 0.3	16.36 .71	5.9 0.8	3.36 .30	7.1 0.2
25.7	60.00 +.26	60.8 -0.7	3.75 +.28	45.2 -0.5	17.09 +.68	6.9 +1.1	3.66 +.30	6.8 -0.3
Nov. 4.7	60.25 .24	60.1 0.8	4.02 .26	44.7 0.5	17.77 .60	8.2 1.5	3.95 .28	6.5 0.2
14.6	60.49 .22	59.2 0.9	4.28 .24	44.1 0.6	18.40 .52	9.8 1.8	4.23 .26	6.1 0.3
24.6	60.70 .20	58.2 1.0	4.51 .21	43.5 0.6	18.96 .42	11.8 2.1	4.48 .24	5.8 0.3
Dec. 4.6	60.88 .16	57.2 1.0	4.70 .18	42.9 0.6	19.44 .31	14.0 2.3	4.70 .21	5.6 0.2
14.5	61.02 +.12	56.2 -1.0	4.87 +.14	42.3 -0.6	19.81 +.20	16.5 +2.5	4.89 +.17	5.4 -0.1
24.5	61.13 .08	55.3 0.9	4.99 .10	41.7 0.5	20.06 +.07	19.0 2.6	5.04 .12	5.3 -0.1
34.5	61.19 +.04	54.4 -0.8	5.07 +.05	41.3 -0.4	20.20 -.07	21.7 +2.7	5.14 +.08	5.3 0.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Argus. (Canopus.)		$\gamma$ Geminorum.		$\alpha$ Canis Majoris. (Sirius.)		$\epsilon$ Canis Majoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 6 21	—52° 37'	<sup>h</sup> <sup>m</sup> 6 31	+16° 29'	<sup>h</sup> <sup>m</sup> 6 40	—16° 33'	<sup>h</sup> <sup>m</sup> 6 54	—28° 48'
(Dec. 30.5)	<sup>s</sup> 26.43 +.01	71.1 —3.5	<sup>s</sup> 5.72 +.10	35.8 —0.4	<sup>s</sup> 6.47 +.09	45.8 —2.4	<sup>s</sup> 8.19 +.09	69.2 —3.0
Jan. 9.5	26.41 —.06	74.5 3.3	5.80 +.05	35.4 0.3	6.53 +.04	48.1 2.3	8.25 +.04	72.1 2.8
19.4	26.31 .13	77.7 3.0	5.83 .00	35.1 0.2	6.54 —.01	50.3 2.1	8.26 —.02	74.9 2.6
29.4	26.14 .90	80.6 2.7	5.80 —.05	34.9 0.2	6.50 .06	52.2 1.8	8.22 .07	77.3 2.3
Feb. 8.4	25.92 .96	83.1 2.3	5.74 .09	34.8 —0.1	6.42 .10	53.9 1.5	8.12 .12	79.5 2.0
18.4	25.64 —.30	85.1 —1.8	5.62 —.13	34.8 0.0	6.29 —.14	55.3 —1.2	7.98 —.16	81.4 —1.7
28.3	25.32 .33	86.7 1.3	5.48 .16	34.8 0.0	6.14 .17	56.4 0.9	7.81 .19	82.9 1.3
Mar. 10.3	24.97 .35	87.8 0.8	5.30 .18	34.8 +0.1	5.95 .19	57.1 0.6	7.61 .21	83.9 0.9
20.3	24.61 .36	88.3 —0.3	5.12 .19	34.9 0.1	5.76 .20	57.5 —0.3	7.39 .22	84.6 —0.5
30.3	24.25 .36	88.3 +0.3	4.93 .19	35.0 0.1	5.55 .20	57.6 +0.1	7.16 .22	84.8 0.0
Apr. 9.2	23.89 —.34	87.8 +0.8	4.75 —.17	35.1 +0.1	5.36 —.19	57.4 +0.4	6.94 —.22	84.7 +0.4
19.2	23.56 .32	86.8 1.2	4.58 .15	35.2 0.1	5.18 .17	56.8 0.7	6.72 .20	84.1 0.6
29.2	23.26 .26	85.3 1.7	4.44 .12	35.3 0.1	5.02 .15	56.0 1.0	6.53 .18	83.2 1.1
May 9.2	23.00 .23	83.4 2.1	4.33 .09	35.5 0.2	4.88 .11	54.9 1.3	6.37 .15	81.9 1.5
19.1	22.79 .18	81.0 2.5	4.26 .05	35.6 0.2	4.79 .08	53.5 1.5	6.24 .11	80.2 1.8
29.1	22.64 —.13	78.4 +2.8	4.23 —.01	35.9 +0.2	4.73 —.04	51.9 +1.7	6.15 —.07	78.3 +2.1
June 8.1	22.54 —.07	75.5 3.0	4.24 +.03	36.1 0.3	4.71 .00	50.1 1.9	6.10 —.03	76.1 2.3
18.0	22.51 .00	72.4 3.2	4.29 .07	36.4 0.3	4.72 +.04	48.1 2.0	6.08 +.01	73.7 2.5
28.0	22.53 +.06	69.1 3.3	4.38 .11	36.8 0.4	4.78 .07	46.1 2.1	6.11 .05	71.2 2.6
July 8.0	22.62 .11	65.8 3.2	4.51 .14	37.1 0.4	4.87 .11	44.0 2.1	6.18 .09	68.6 2.6
18.0	22.76 +.17	62.0 +3.1	4.67 +.18	37.5 +0.4	5.00 +.14	41.9 +2.0	6.29 +.13	66.0 +2.5
27.9	22.96 .22	59.6 2.9	4.86 .20	37.9 0.4	5.16 .17	40.0 1.9	6.44 .16	63.6 2.4
Aug. 6.9	23.21 .27	56.8 2.6	5.08 .23	38.2 0.3	5.35 .20	38.1 1.7	6.62 .19	61.2 2.2
16.9	23.50 .31	54.3 2.2	5.32 .25	38.5 0.2	5.56 .22	36.5 1.5	6.82 .22	59.1 1.9
26.8	23.83 .35	52.3 1.8	5.57 .26	38.7 +0.2	5.80 .24	35.2 1.2	7.06 .25	57.4 1.6
Sept. 5.8	24.20 +.37	50.8 +1.2	5.85 +.28	38.8 0.0	6.05 +.26	34.2 +0.8	7.32 +.27	56.0 +1.1
15.8	24.58 .29	49.8 +0.6	6.13 .29	38.8 —0.1	6.32 .27	33.6 +0.4	7.60 .28	55.1 0.6
25.8	24.98 .40	49.5 0.0	6.42 .29	38.7 0.2	6.60 .28	33.5 —0.1	7.89 .30	54.7 +0.1
Oct. 5.7	25.39 .40	49.8 —0.6	6.72 .30	38.4 0.3	6.88 .29	33.8 0.5	8.19 .30	54.9 —0.4
15.7	25.79 .39	50.8 1.3	7.02 .30	38.0 0.5	7.17 .28	34.5 1.0	8.50 .31	55.6 0.9
25.7	26.17 +.37	52.3 —1.8	7.32 +.29	37.4 —0.6	7.45 +.28	35.7 —1.4	8.80 +.30	56.7 —1.4
Nov. 4.7	26.53 .34	54.5 2.4	7.60 .28	36.8 0.6	7.73 .27	37.2 1.7	9.10 .29	58.4 1.9
14.6	26.85 .30	57.1 2.8	7.88 .26	36.2 0.7	7.99 .25	39.1 2.0	9.38 .27	60.5 2.3
24.6	27.12 .26	60.1 3.2	8.13 .24	35.5 0.7	8.23 .23	41.2 2.2	9.64 .24	62.9 2.6
Dec. 4.6	27.34 .19	63.4 3.4	8.36 .21	34.8 0.6	8.44 .19	43.6 2.4	9.87 .21	65.7 2.8
14.5	27.50 +.12	66.9 —3.5	8.56 +.17	34.2 —0.6	8.62 +.16	46.0 —2.4	10.05 +.17	68.6 —2.9
24.5	27.59 +.05	70.5 3.5	8.71 .13	33.6 0.5	8.75 .11	48.5 2.4	10.20 .12	71.5 2.9
34.5	27.61 —.02	74.0 —3.4	8.82 +.09	33.2 —0.4	8.84 +.06	50.8 —2.3	10.29 +.05	74.4 —2.9



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Canis Majoris.		$\delta$ Geminorum.		Piazzi vii. 67.		$\alpha^2$ Geminorum. (Castor.)	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 7 <sup>m</sup> 3	<sup>°</sup> -26 <sup>'</sup> 12	<sup>h</sup> 7 <sup>m</sup> 13	<sup>°</sup> +22 <sup>'</sup> 11	<sup>h</sup> 7 <sup>m</sup> 18	<sup>°</sup> +68 <sup>'</sup> 41	<sup>h</sup> 7 <sup>m</sup> 27	<sup>°</sup> +32 <sup>'</sup> 8
(Dec.30.5)	<sup>s</sup> 44.68 +.10	<sup>"</sup> 50.5 -2.9	<sup>s</sup> 16.88 +.15	<sup>"</sup> 22.5 -0.3	<sup>s</sup> 58.02 +.31	<sup>"</sup> 41.9 +2.4	<sup>s</sup> 17.40 +.18	<sup>"</sup> 9.8 +0.3
Jan. 9.5	44.75 +.05	53.3 2.7	17.00 .10	22.4 -0.1	58.26 .18	44.4 2.5	17.55 .19	10.2 0.5
19.5	44.78 .00	56.0 2.6	17.08 +.05	22.4 +0.1	58.38 +.05	46.9 2.6	17.65 .06	10.8 0.6
29.5	44.75 -.05	58.4 2.3	17.10 -.01	22.5 0.2	58.37 -.07	49.5 2.5	17.68 +.01	11.5 0.7
Feb. 8.4	44.67 .10	60.6 2.0	17.06 .06	22.7 0.3	58.23 .20	52.0 2.4	17.66 -.05	12.3 0.8
18.4	44.55 -.14	62.4 -1.6	16.98 -.10	23.0 +0.3	57.98 -.30	54.3 +2.1	17.58 -.10	13.1 +0.8
28.4	44.38 .18	63.9 1.3	16.86 .14	23.3 0.3	57.63 .30	56.3 1.8	17.46 .14	13.9 0.8
Mar. 10.3	44.20 .20	64.9 0.9	16.70 .17	23.7 0.3	57.19 .46	57.9 1.4	17.30 .18	14.6 0.7
20.3	43.99 .21	65.6 0.5	16.52 .18	24.0 0.3	56.70 .51	59.1 0.9	17.11 .20	15.3 0.6
30.3	43.77 .22	65.9 -0.1	16.33 .19	24.3 0.3	56.17 .53	59.8 +0.5	16.90 .21	15.8 0.4
Apr. 9.3	43.55 -.21	65.8 +0.3	16.14 -.19	24.5 +0.2	55.64 -.53	60.1 0.0	16.69 -.20	16.1 +0.3
19.2	43.34 .20	65.4 0.7	15.96 .17	24.7 0.1	55.12 .50	59.8 -0.5	16.49 .19	16.3 +0.1
29.2	43.16 .17	64.5 1.0	15.80 .15	24.8 +0.1	54.64 .45	59.1 0.9	16.31 .17	16.3 -0.1
May 9.2	43.00 .14	63.3 1.4	15.66 .12	24.9 0.0	54.21 .30	58.0 1.3	16.15 .14	16.1 0.2
19.1	42.87 .11	61.8 1.7	15.56 .08	24.9 0.0	53.87 .30	56.4 1.7	16.03 .10	15.9 0.3
29.1	42.77 -.07	60.0 +1.9	15.50 -.04	24.9 0.0	53.60 -.21	54.5 -2.0	15.94 -.06	15.5 -0.5
June 8.1	42.72 -.04	58.0 2.1	15.47 -.01	24.8 0.0	53.44 .19	52.4 2.3	15.90 -.02	14.9 0.5
18.1	42.70 .00	55.7 2.3	15.48 +.03	24.8 -0.1	53.37 -.02	50.0 2.4	15.90 +.02	14.4 0.6
28.0	42.73 +.04	53.3 2.4	15.54 .07	24.7 0.1	53.40 +.08	47.6 2.5	15.94 .06	13.7 0.7
July 8.0	42.79 .08	50.9 2.5	15.63 .11	24.6 0.1	53.53 .18	45.0 2.6	16.02 .10	13.0 0.7
18.0	42.89 +.12	48.4 +2.4	15.75 +.14	24.5 -0.1	53.76 +.27	42.4 -2.5	16.14 +.14	12.3 -0.7
28.0	43.03 .15	46.0 2.3	15.91 .17	24.4 0.1	54.08 .36	39.9 2.5	16.30 .17	11.6 0.7
Aug. 6.9	43.19 .18	43.8 2.1	16.10 .20	24.3 0.2	54.48 .44	37.5 2.3	16.49 .20	10.8 0.8
16.9	43.39 .21	41.8 1.9	16.32 .23	24.1 0.2	54.96 .51	35.3 2.1	16.71 .23	10.0 0.8
26.9	43.62 .24	40.1 1.5	16.56 .25	23.8 0.3	55.51 .57	33.2 1.9	16.96 .26	9.2 0.8
Sept. 5.9	43.87 +.26	38.7 +1.1	16.81 +.27	23.5 -0.4	56.11 +.63	31.4 -1.7	17.23 +.26	8.5 -0.8
15.8	44.13 .28	37.9 0.6	17.09 .28	23.1 0.4	56.76 .67	29.9 1.4	17.52 .30	7.7 0.8
25.8	44.42 .29	37.4 +0.2	17.38 .30	22.6 0.5	57.46 .71	28.6 1.1	17.83 .32	6.9 0.8
Oct. 5.8	44.71 .30	37.5 -0.4	17.69 .31	22.0 0.6	58.18 .73	27.7 0.7	18.16 .33	6.1 0.8
15.7	45.02 .30	38.2 0.9	18.00 .31	21.4 0.7	58.93 .74	27.2 -0.3	18.50 .34	5.3 0.7
25.7	45.32 +.30	39.3 -1.3	18.31 +.32	20.7 -0.7	59.67 +.74	27.0 0.0	18.84 +.35	4.6 -0.7
Nov. 4.7	45.62 .29	40.8 1.8	18.63 .31	20.0 0.7	60.41 .73	27.3 +0.5	19.19 .34	4.0 0.6
14.7	45.90 .27	42.9 2.2	18.94 .30	19.2 0.7	61.12 .69	27.9 0.9	19.53 .33	3.4 0.4
24.6	46.16 .25	45.2 2.5	19.23 .28	18.6 0.6	61.79 .64	29.0 1.3	19.86 .31	3.1 0.3
Dec. 4.6	46.40 .22	47.8 2.7	19.50 .26	18.0 0.5	62.40 .57	30.5 1.7	20.16 .29	2.8 -0.1
14.6	46.60 +.18	50.6 -2.8	19.74 +.22	17.5 -0.4	62.93 +.48	32.3 +2.0	20.43 +.25	2.6 +0.1
24.6	46.75 .13	53.5 2.9	19.94 .18	17.1 0.3	63.36 .38	34.5 2.3	20.67 .21	3.0 0.2
34.5	46.86 +.06	56.3 -2.8	20.10 +.13	16.9 -0.1	63.69 +.28	36.8 +2.5	20.85 +.16	3.3 +0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Canis Minoris. (Procyon.)		$\beta$ Geminorum. (Pollux.)		$\phi$ Geminorum.		3 Ursæ Majoris (H.)		
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	
	<sup>h</sup> 7 33	<sup>m</sup> + 5 30'	<sup>h</sup> 7 38	<sup>m</sup> +28 17'	<sup>h</sup> 7 46	<sup>m</sup> +27 3'	<sup>h</sup> 8 1	<sup>m</sup> +68 48'	
	<sup>s</sup>	<sup>s</sup>	<sup>s</sup>	<sup>s</sup>	<sup>s</sup>	<sup>s</sup>	<sup>s</sup>	<sup>s</sup>	
(Dec.30.5)	18.40 +.15	57.4 -1.4	18.29 +.19	57.3 0.0	29.07 +.19	31.6 -0.1	24.64 +.41	22.9 +2.1	
Jan. 9.5	18.52 .10	56.1 1.2	18.44 .13	57.4 +0.2	29.24 .14	31.6 +0.1	24.99 .29	25.1 2.4	
19.5	18.61 +.05	55.0 1.0	18.54 .07	57.8 0.4	29.35 .08	31.9 0.3	25.22 .16	27.6 2.6	
29.5	18.64 .00	54.1 0.8	18.59 +.02	58.2 0.5	29.40 +.03	32.2 0.5	25.31 +.03	30.3 2.6	
Feb. 8.4	18.62 -.04	53.3 0.7	18.58 -.03	58.8 0.6	29.40 -.03	32.8 0.6	25.28 -.09	32.9 2.6	
	18.4	18.55 -.09	52.8 -0.5	18.52 -.09	59.5 +0.7	29.34 -.08	33.4 +0.6	25.13 -.21	35.4 +2.4
	28.4	18.44 .12	52.4 0.3	18.40 .13	60.1 0.7	29.24 .12	34.0 0.6	24.86 .31	37.7 2.2
Mar.10.3	18.31 .15	52.1 -0.2	18.25 .16	60.8 0.6	29.10 .16	34.7 0.6	24.50 .40	39.8 1.9	
	20.3	18.15 .17	52.1 0.0	18.07 .19	61.4 0.5	28.93 .18	35.2 0.6	24.06 .47	41.5 1.5
	30.3	17.97 .18	52.1 +0.1	17.88 .20	61.9 0.4	28.74 .19	35.8 0.5	23.56 .51	42.7 1.0
Apr. 9.3	17.79 -.18	52.3 +0.2	17.68 -.20	62.3 +0.3	28.55 -.19	36.2 +0.4	23.04 -.52	43.5 +0.5	
	19.2	17.62 .17	52.6 0.3	17.49 .19	62.6 0.2	28.36 .18	36.5 0.2	22.51 .52	43.8 0.0
	29.2	17.46 .15	52.9 0.4	17.31 .17	62.7 +0.1	28.18 .17	36.7 +0.1	22.00 .49	43.6 -0.4
May 9.2	17.33 .12	53.4 0.5	17.15 .14	62.7 0.0	28.03 .14	36.8 0.0	21.53 .44	42.9 0.9	
	19.2	17.22 .09	53.9 0.6	17.03 .11	62.6 -0.2	27.90 .11	36.7 -0.1	21.12 .38	41.8 1.2
	20.1	17.14 -.06	54.6 +0.7	16.94 -.07	62.4 -0.3	27.81 -.07	36.6 -0.2	20.78 -.30	40.3 -1.7
June 8.1	17.10 -.03	55.3 0.7	16.89 -.03	62.1 0.3	27.76 -.04	36.4 0.3	20.52 .21	38.4 2.0	
	18.1	17.09 +.01	56.0 0.8	16.88 +.01	61.7 0.4	27.74 .00	36.1 0.3	20.35 .12	36.2 2.3
	28.0	17.12 .04	56.8 0.8	16.91 .05	61.2 0.5	27.76 +.04	35.7 0.4	20.28 -.02	33.8 2.5
July 8.0	17.18 .08	57.6 0.8	16.98 .09	60.8 0.5	27.82 .06	35.3 0.5	20.30 +.07	31.3 2.6	
	18.0	17.27 +.11	58.4 +0.8	17.08 +.12	60.2 -0.5	27.92 +.11	34.8 -0.5	20.42 +.16	28.6 -2.7
	28.0	17.40 .14	59.2 0.7	17.22 .16	59.7 0.6	28.05 .15	34.3 0.5	20.63 .25	25.8 2.7
Aug. 6.9	17.55 .16	59.9 0.6	17.40 .19	59.1 0.6	28.21 .18	33.7 0.6	20.93 .34	23.3 2.6	
	16.9	17.73 .19	60.4 0.5	17.60 .22	58.5 0.7	28.41 .21	33.1 0.6	21.31 .42	20.7 2.6
	26.9	17.93 .21	60.8 0.3	17.82 .24	57.8 0.7	28.63 .23	32.5 0.7	21.76 .49	18.2 2.4
Sept. 5.9	18.15 +.22	61.0 +0.1	18.08 +.22	57.0 -0.7	28.87 +.22	31.7 -0.8	22.29 +.56	15.9 -2.2	
	15.8	18.40 .25	61.0 -0.1	18.35 .28	56.3 0.8	29.14 .26	31.0 0.8	22.88 .62	13.8 2.0
	25.8	18.66 .27	60.8 0.4	18.64 .30	55.5 0.8	29.43 .30	30.1 0.9	23.52 .66	11.9 1.7
Oct. 5.8	18.93 .28	60.3 0.6	18.96 .32	54.6 0.8	29.73 .31	29.2 0.9	24.21 .70	10.4 1.4	
	15.7	19.22 .29	59.5 0.8	19.28 .33	53.8 0.8	30.05 .32	28.3 0.9	24.93 .73	9.2 1.0
	25.7	19.51 +.29	58.6 -1.1	19.61 +.33	52.9 -0.8	30.38 +.33	27.4 -0.9	25.67 +.75	8.4 -0.6
Nov. 4.7	19.80 .29	57.4 1.2	19.94 .33	52.1 0.8	30.71 .33	26.5 0.9	26.43 .75	8.0 -0.2	
	14.7	20.10 .29	56.1 1.4	20.28 .32	51.4 0.7	31.05 .31	25.7 0.8	27.17 .73	8.1 +0.2
	24.6	20.38 .27	54.6 1.4	20.60 .31	50.8 0.5	31.37 .29	25.0 0.7	27.89 .70	8.6 0.7
Dec. 4.6	20.64 .26	53.2 1.5	20.90 .29	50.3 0.4	31.67 .26	24.4 0.5	28.57 .64	9.5 1.2	
	14.6	20.87 +.22	51.7 -1.5	21.17 +.25	50.0 -0.2	31.95 +.22	24.0 -0.3	29.18 +.57	10.9 +1.6
	24.6	21.07 .18	50.2 1.4	21.40 .21	49.9 0.0	32.19 .17	23.7 -0.1	29.70 .47	12.7 1.9
	34.5	21.23 +.14	48.9 -1.3	21.59 +.16	49.9 +0.2	32.39 +.12	23.7 +0.1	30.13 +.37	14.8 +2.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	15 Argus ( $\iota$ )		$\eta$ Cancri.		$\epsilon$ Hydræ.		$\iota$ Ursæ Majoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 8 <sup>m</sup> 2	<sup>°</sup> -23 <sup>'</sup> 58	<sup>h</sup> 8 <sup>m</sup> 26	<sup>°</sup> +20 <sup>'</sup> 49	<sup>h</sup> 8 <sup>m</sup> 40	<sup>°</sup> + 6 <sup>'</sup> 50	<sup>h</sup> 8 <sup>m</sup> 51	<sup>°</sup> +48 <sup>'</sup> 29
(Dec. 30.6)	<sup>s</sup> 40.50 +.17	<sup>"</sup> 31.6 -2.9	<sup>s</sup> 4.88 +.21	<sup>"</sup> 38.2 -0.6	<sup>s</sup> 42.49 +.21	<sup>"</sup> 13.0 -1.5	<sup>s</sup> 21.28 +.32	<sup>"</sup> 14.8 +0.7
Jan. 9.5	40.64 .12	34.5 2.8	5.07 .17	37.7 0.4	42.69 .17	11.6 1.3	21.57 .25	15.7 1.1
19.5	40.73 .06	37.2 2.7	5.22 .12	37.4 -0.2	42.83 .12	10.4 1.1	21.79 .19	17.0 1.4
29.5	40.76 +.01	39.8 2.5	5.31 .07	37.4 0.0	42.93 .07	9.4 0.9	21.95 .12	18.5 1.6
Feb. 8.5	40.75 -.04	42.2 2.3	5.35 +.01	37.5 +0.2	42.98 +.02	8.6 0.7	22.02 +.04	20.2 1.8
18.4	40.68 -.09	44.2 -1.9	5.33 -.04	37.8 +0.4	42.97 -.03	8.1 -0.4	22.03 -.03	22.1 +1.8
28.4	40.57 .13	46.0 1.6	5.27 .08	38.2 0.5	42.93 .07	7.7 0.3	21.96 .10	23.9 1.8
Mar. 10.4	40.43 .16	47.4 1.2	5.17 .12	38.7 0.5	42.84 .10	7.6 -0.1	21.84 .15	25.7 1.7
20.4	40.26 .18	48.5 0.9	5.03 .15	39.2 0.5	42.72 .13	7.6 +0.1	21.66 .20	27.3 1.6
30.3	40.07 .20	49.1 0.5	4.87 .17	39.8 0.5	42.57 .15	7.7 0.2	21.44 .23	28.8 1.3
Apr. 9.3	39.87 -.20	49.5 -0.2	4.70 -.17	40.3 +0.5	42.42 -.16	8.0 +0.3	21.20 -.25	30.0 +1.0
19.3	39.67 .19	49.4 +0.2	4.52 .17	40.8 0.4	42.25 .16	8.3 0.4	20.94 .26	30.9 0.7
29.3	39.48 .18	49.0 0.6	4.35 .16	41.2 0.4	42.10 .15	8.8 0.5	20.69 .25	31.4 +0.4
May 9.2	39.31 .16	48.3 .0.9	4.20 .15	41.5 0.3	41.95 .14	9.3 0.5	20.44 .23	31.6 0.0
19.2	39.16 .14	47.2 1.2	4.06 .12	41.8 0.2	41.82 .12	9.8 0.6	20.22 .21	31.5 -0.3
29.2	39.03 -.11	45.9 +1.5	3.95 -.09	42.0 +0.1	41.71 -.10	10.4 +0.6	20.03 -.17	31.0 -0.6
June 8.1	38.94 .08	44.2 1.7	3.87 .06	42.1 +0.1	41.63 .07	11.0 0.6	19.87 .13	30.2 0.9
18.1	38.88 .04	42.4 1.9	3.83 -.03	42.2 0.0	41.57 .04	11.6 0.6	19.76 .09	29.1 1.2
28.1	38.86 -.01	40.3 2.1	3.82 .00	42.2 -0.1	41.54 -.01	12.3 0.6	19.69 -.05	27.8 1.4
July 8.1	38.86 +.03	38.2 2.2	3.84 +.04	42.1 0.1	41.55 +.02	12.9 0.6	19.67 .00	26.3 1.6
18.0	38.91 +.06	36.0 +2.2	3.89 +.07	41.9 -0.2	41.58 +.05	13.5 +0.6	19.69 +.05	24.6 -1.8
28.0	38.99 .09	33.8 2.2	3.97 .10	41.6 0.3	41.64 .08	14.0 0.5	19.76 .09	22.7 1.9
Aug. 7.0	39.10 .13	31.6 2.1	4.09 .13	41.3 0.4	41.74 .11	14.5 0.4	19.87 .13	20.8 2.0
17.0	39.24 .16	29.6 1.9	4.24 .16	40.9 0.5	41.86 .13	14.8 0.3	20.03 .18	18.7 2.1
26.9	39.41 .19	27.9 1.6	4.41 .19	40.3 0.6	42.00 .16	15.0 +0.1	20.22 .22	16.7 2.1
Sept. 5.9	39.62 +.22	26.5 +1.3	4.61 +.21	39.7 -0.7	42.17 +.19	15.0 -0.1	20.46 +.26	14.6 -2.1
15.9	39.85 .24	25.4 0.8	4.83 .24	38.9 0.8	42.37 .21	14.8 0.3	20.74 .30	12.5 2.0
25.8	40.10 .27	24.8 +0.4	5.08 .26	38.0 1.0	42.60 .24	14.4 0.5	21.06 .33	10.5 1.9
Oct. 5.8	40.38 .28	24.6 -0.1	5.36 .28	37.0 1.1	42.85 .26	13.7 0.8	21.41 .37	8.6 1.8
15.8	40.67 .30	24.9 0.6	5.65 .30	35.8 1.1	43.12 .28	12.8 1.0	21.79 .39	6.9 1.7
25.8	40.98 +.31	25.8 -1.1	5.96 +.32	34.7 -1.2	43.40 +.29	11.6 -1.2	22.20 +.42	5.3 -1.4
Nov. 4.7	41.29 .31	27.1 1.5	6.28 .32	33.4 1.2	43.70 .30	10.3 1.4	22.63 .43	4.0 1.2
14.7	41.60 .30	28.8 1.9	6.61 .33	32.2 1.2	44.01 .31	8.8 1.5	23.07 .44	2.9 0.9
24.7	41.89 .29	31.0 2.3	6.93 .32	31.0 1.2	44.32 .30	7.2 1.6	23.51 .44	2.2 0.6
Dec. 4.7	42.17 .26	33.4 2.5	7.24 .30	29.8 1.1	44.62 .29	5.6 1.6	23.94 .42	1.8 -0.2
14.6	42.42 +.23	36.0 -2.7	7.54 +.26	28.9 -0.9	44.90 +.27	3.9 -1.6	24.34 +.39	1.8 +0.2
24.6	42.64 .19	38.8 2.8	7.80 .24	28.1 0.7	45.16 .24	2.4 1.5	24.72 .35	2.1 0.6
34.6	42.81 +.14	41.7 -2.9	8.02 +.20	27.4 -0.5	45.38 +.20	1.0 -1.4	25.04 +.29	2.9 +1.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\sigma^2$ Ursæ Majoris.		$\kappa$ Cancr.		$\epsilon$ Argus.		1 Draconis (H.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 9 <sup>m</sup> 0	<sup>°</sup> +67 <sup>'</sup> 35	<sup>h</sup> 9 <sup>m</sup> 1	<sup>°</sup> +11 <sup>'</sup> 7	<sup>h</sup> 9 <sup>m</sup> 13	<sup>°</sup> -58 <sup>'</sup> 47	<sup>h</sup> 9 <sup>m</sup> 20	<sup>°</sup> +81 <sup>'</sup> 49
(Dec.30.6)	<sup>s</sup> 17.86 +.51	<sup>"</sup> 41.7 +1.5	<sup>s</sup> 32.35 +.94	<sup>"</sup> 37.8 -1.3	<sup>s</sup> 63.51 +.31	<sup>"</sup> 30.7 -3.4	<sup>s</sup> 41.07 1.31	<sup>"</sup> 38.5 +1.9
Jan. 9.6	18.32 .41	43.5 1.9	32.57 .19	36.6 1.1	63.78 .23	34.3 3.6	42.26 1.06	40.6 2.3
19.6	18.68 .30	45.6 2.3	32.74 .15	35.6 0.9	63.98 .15	38.0 3.7	43.20 +.80	43.1 2.7
29.5	18.92 .18	48.1 2.5	32.86 .10	34.9 0.6	64.09 +.07	41.8 3.8	43.85 .50	45.9 2.9
Feb. 8.5	19.04 +.06	50.7 2.6	32.93 +.04	34.3 0.4	64.12 -.01	45.5 3.6	44.19 +.18	49.0 3.1
18.5	19.04 -.06	53.3 +2.6	32.95 .00	34.0 -0.9	64.06 -.09	49.1 -3.5	44.22 -.12	52.0 +3.1
28.4	18.92 .17	55.9 2.5	32.92 -.05	33.9 0.0	63.93 .16	52.5 3.2	43.94 .42	55.1 3.0
Mar. 10.4	18.69 .37	58.4 2.3	32.85 .09	34.0 +0.1	63.74 .32	55.5 2.8	43.38 .70	58.0 2.7
20.4	18.37 .36	60.6 2.1	32.75 .19	34.2 0.3	63.48 .38	58.2 2.5	42.56 .33	60.5 2.4
30.4	17.98 .42	62.5 1.7	32.61 .14	34.5 0.4	63.18 .32	60.4 2.0	41.51 1.12	62.7 2.0
Apr. 9.3	17.54 -.46	64.0 +1.2	32.46 -.15	34.9 +0.4	62.84 -.35	62.2 -1.6	40.30 1.27	64.5 +1.5
19.3	17.06 .48	65.0 0.8	32.31 .16	35.4 0.5	62.49 .36	63.5 1.1	38.98 1.35	65.7 1.0
29.3	16.57 .48	65.6 +0.3	32.15 .15	35.8 0.5	62.12 .37	64.3 -0.6	37.60 1.39	66.4 +0.4
May 9.3	16.11 .46	65.6 -0.2	32.00 .14	36.4 0.5	61.75 .36	64.6 0.0	36.21 1.37	66.5 -0.2
19.2	15.66 .42	65.2 0.7	31.87 .13	36.9 0.5	61.39 .35	64.4 +0.5	34.87 1.30	66.1 0.7
29.2	15.27 -.37	64.3 -1.1	31.75 -.10	37.4 +0.5	61.05 -.33	63.7 +1.0	33.61 1.19	65.1 -1.3
June 8.2	14.93 .30	63.0 1.5	31.66 .08	37.8 0.5	60.74 .30	62.5 1.4	32.48 1.05	63.6 1.7
18.1	14.66 .23	61.2 1.9	31.59 .05	38.3 0.5	60.46 .36	60.8 1.9	31.51 .88	61.6 2.2
28.1	14.46 .15	59.2 2.2	31.55 -.03	38.8 0.4	60.22 .31	58.7 2.3	30.73 .68	59.2 2.5
July 8.1	14.35 -.07	56.9 2.4	31.54 .00	39.2 0.4	60.03 .16	56.3 2.6	30.15 .47	56.5 2.8
18.1	14.32 +.01	54.3 -2.6	31.56 +.03	39.5 +0.3	59.89 -.11	53.5 +2.8	29.80 -.25	53.5 -3.1
28.0	14.37 .09	51.6 2.8	31.60 .06	39.8 0.2	59.82 -.05	50.6 3.0	29.66 -.02	50.4 3.2
Aug. 7.0	14.50 .17	48.7 2.9	31.68 .09	39.9 +0.1	59.80 +.01	47.6 3.1	29.76 +.21	47.0 3.3
17.0	14.72 .25	45.9 2.9	31.78 .11	40.0 0.0	59.85 .08	44.5 3.0	30.09 .44	43.7 3.4
27.0	15.01 .33	43.0 2.8	31.91 .14	39.8 -0.2	59.97 .15	41.6 2.9	30.64 .66	40.3 3.3
Sept. 5.9	15.38 +.40	40.2 -2.8	32.07 +.17	39.6 -0.4	60.15 +.22	38.8 +2.6	31.41 +.87	37.0 -3.2
15.9	15.82 .47	37.5 2.6	32.25 .20	39.1 0.6	60.40 .28	36.3 2.3	32.39 1.07	33.9 3.0
25.9	16.32 .53	35.0 2.4	32.46 .23	38.4 0.8	60.72 .34	34.3 1.8	33.55 1.25	31.0 2.8
Oct. 5.8	16.89 .59	32.7 2.2	32.70 .25	37.5 1.0	61.09 .39	32.7 1.3	34.89 1.41	28.4 2.5
15.8	17.51 .64	30.6 1.9	32.97 .27	36.5 1.2	61.51 .44	31.7 +0.7	36.38 1.55	26.1 2.1
25.8	18.17 +.68	29.0 -1.5	33.25 +.29	35.2 -1.3	61.96 +.47	31.3 0.0	37.99 1.66	24.2 -1.6
Nov. 4.8	18.87 .70	27.7 1.1	33.56 .31	33.9 1.5	62.45 .49	31.6 -0.6	39.70 1.73	22.8 1.2
14.7	19.58 .71	26.8 0.6	33.87 .32	32.3 1.6	62.94 .49	32.5 1.2	41.46 1.77	21.9 0.6
24.7	20.29 .70	26.4 -0.1	34.19 .31	30.7 1.6	63.43 .48	34.0 1.8	43.24 1.76	21.5 -0.1
Dec. 4.7	20.99 .68	26.5 +0.4	34.50 .30	29.1 1.6	63.90 .45	36.1 2.4	44.98 1.70	21.7 +0.5
14.7	21.65 +.63	27.1 +0.8	34.79 +.29	27.5 -1.5	64.33 +.40	38.8 -2.9	46.65 1.80	22.5 +1.0
24.6	22.25 .56	28.2 1.3	35.07 .26	26.1 1.4	64.71 .35	41.9 3.2	48.17 1.44	23.8 1.6
34.6	22.78 +.48	29.8 +1.7	35.31 +.22	24.8 -1.2	65.03 +.28	45.3 -3.5	49.52 1.94	25.6 +2.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Hydræ.		$\delta$ Ursæ Majoris.		$\theta$ Ursæ Majoris.		$\epsilon$ Leonis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 9 21	— <sup>°</sup> <sup>'</sup> 8 9	<sup>h</sup> <sup>m</sup> 9 24	+ <sup>°</sup> <sup>'</sup> 70 19	<sup>h</sup> <sup>m</sup> 9 25	+ <sup>°</sup> <sup>'</sup> 52 11	<sup>h</sup> <sup>m</sup> 9 39	+ <sup>°</sup> <sup>'</sup> 24 17
(Dec. 30.6)	57.48 +.24	45.3 —2.3	19.66 +.61	44.7 +1.4	10.86 +.38	43.6 +0.6	20.39 +.38	57.4 —0.9
Jan. 9.6	57.70 .90	47.5 2.2	20.22 .51	46.3 1.9	11.20 .31	44.5 1.0	20.65 .94	56.8 0.5
19.6	57.87 .15	49.6 2.0	20.63 .39	48.4 2.3	11.48 .94	45.7 1.4	20.87 .90	56.4 —0.2
29.5	58.01 .10	51.5 1.8	21.01 .96	50.8 2.5	11.69 .17	47.3 1.7	21.04 .14	56.3 +0.1
Feb. 8.5	58.09 .06	53.3 1.6	21.20 +.12	53.5 2.7	11.82 .09	49.1 1.9	21.16 .09	56.5 0.3
18.5	58.12 +.01	54.8 —1.4	21.26 —.01	56.3 +2.8	11.88 +.01	51.1 +2.0	21.22 +.04	57.0 +0.6
28.4	58.10 —.04	56.0 1.1	21.18 .14	59.1 2.7	11.85 —.06	53.2 2.1	21.23 —.01	57.6 0.7
Mar. 10.4	58.04 .07	57.0 0.9	20.97 .96	61.7 2.6	11.76 .12	55.3 2.0	21.19 .06	58.4 0.9
20.4	57.95 .11	57.8 0.6	20.66 .36	64.2 2.3	11.60 .18	57.3 1.9	21.11 .10	59.4 0.9
30.4	57.83 .13	58.3 0.4	20.25 .44	66.4 2.0	11.40 .99	59.1 1.7	21.00 .13	60.3 0.9
Apr. 9.3	57.69 —.14	58.5 —0.1	19.78 —.50	68.1 +1.5	11.15 —.25	60.6 +1.4	20.86 —.15	61.2 +0.9
19.3	57.54 .15	58.5 +0.1	19.26 .53	69.4 1.1	10.89 .97	61.9 1.1	20.70 .16	62.1 0.8
29.3	57.39 .15	58.3 0.3	18.71 .55	70.3 0.6	10.61 .97	62.7 0.7	20.54 .16	62.9 0.7
May 9.3	57.24 .14	57.9 0.5	18.17 .54	70.6 +0.1	10.34 .97	63.2 +0.3	20.39 .15	63.6 0.6
19.2	57.10 .13	57.4 0.7	17.64 .51	70.4 —0.4	10.08 .95	63.4 —0.1	20.23 .14	64.1 0.5
29.2	56.98 —.19	56.6 +0.8	17.16 —.46	69.7 —0.9	9.85 —.92	63.1 —0.4	20.10 —.13	64.5 +0.3
June 8.2	56.87 .10	55.7 1.0	16.73 .40	68.6 1.4	9.64 .18	62.5 0.8	19.98 .11	64.8 +0.2
18.1	56.79 .07	54.6 1.1	16.36 .33	67.0 1.8	9.48 .14	61.5 1.1	19.88 .08	64.9 0.0
28.1	56.73 .05	53.5 1.2	16.08 .94	65.0 2.1	9.36 .10	60.2 1.4	19.81 .06	64.8 —0.2
July 8.1	56.69 —.02	52.3 1.2	15.87 .16	62.7 2.4	9.28 .05	58.6 1.7	19.77 —.03	64.6 0.3
18.1	56.68 .00	51.0 +1.3	15.76 —.07	60.1 —2.7	9.25 —.01	56.7 —1.9	19.75 .00	64.2 —0.4
28.0	56.69 +.03	49.7 1.2	15.74 +.09	57.3 2.9	9.26 +.04	54.7 2.1	19.77 +.03	63.7 0.6
Aug. 7.0	56.74 .06	48.5 1.2	15.81 .12	54.4 3.0	9.32 .09	52.5 2.3	19.81 .06	63.0 0.8
17.0	56.81 .09	47.4 1.0	15.97 .21	51.3 3.1	9.43 .13	50.2 2.4	19.88 .09	62.2 0.9
27.0	56.91 .11	46.5 0.9	16.23 .30	48.2 3.1	9.59 .18	47.8 2.4	19.98 .12	61.2 1.0
Sept. 5.9	57.04 +.15	45.7 +0.6	16.57 +.38	45.2 —3.0	9.79 +.23	45.3 —2.4	20.11 +.15	60.1 —1.2
15.9	57.20 .18	45.3 +0.3	16.99 .47	42.2 2.9	10.04 .96	42.9 2.4	20.27 .18	58.8 1.3
25.9	57.39 .21	45.1 0.0	17.50 .54	39.4 2.7	10.33 .31	40.5 2.4	20.47 .21	57.4 1.5
Oct. 5.8	57.61 .23	45.2 —0.3	18.08 .62	36.8 2.5	10.67 .35	38.2 2.3	20.70 .94	55.9 1.6
15.8	57.86 .26	45.7 0.7	18.74 .68	34.5 2.2	11.04 .39	36.0 2.1	20.95 .97	54.2 1.7
25.8	58.13 +.28	46.6 —1.0	19.44 +.73	32.5 —1.8	11.45 +.43	34.0 —1.9	21.24 +.30	52.5 —1.7
Nov. 4.8	58.43 .30	47.8 1.4	20.20 .77	30.9 1.4	11.89 .45	32.2 1.6	21.55 .32	50.8 1.7
14.7	58.73 .31	49.3 1.7	20.98 .79	29.7 0.9	12.35 .46	30.8 1.3	21.88 .33	49.1 1.7
24.7	59.04 .31	51.1 1.9	21.78 .79	29.0 —0.4	12.82 .47	29.7 0.9	22.22 .34	47.5 1.6
Dec. 4.7	59.35 .30	53.1 2.1	22.57 .77	28.9 +0.2	13.29 .46	29.0 —0.6	22.56 .34	46.0 1.4
14.7	59.65 +.29	55.2 —2.2	23.33 +.73	29.3 +0.6	13.74 +.44	28.8 0.0	22.90 +.33	44.6 —1.2
24.6	59.92 .26	57.5 2.2	24.04 .67	30.2 1.1	14.17 .40	28.9 +0.4	23.22 .30	43.5 1.0
34.6	60.17 +.22	59.7 —2.2	24.66 +.57	31.6 +1.6	14.55 +.35	29.5 +0.8	23.50 +.27	42.7 —0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\mu$ Leonis.		$\alpha$ Leonis. (Regulus.)		32 Ursæ Majoris.		$\gamma^1$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 9 <sup>m</sup> 46	+26° 32'	<sup>h</sup> 10 <sup>m</sup> 2	+12° 31'	<sup>h</sup> 10 <sup>m</sup> 9	+65° 40'	<sup>h</sup> 10 <sup>m</sup> 13	+20° 24'
(Dec. 30.6)	<sup>s</sup> 14.32 +.39	" 38.5 -0.8	<sup>s</sup> 15.78 +.38	" 32.9 -1.5	<sup>s</sup> 41.34 +.57	" 31.6 +0.8	<sup>s</sup> 38.75 +.30	" 69.5 -1.2
Jan. 9.6	14.59 .35	37.9 0.4	16.05 .35	31.6 1.2	41.88 .50	32.6 1.2	39.03 .36	68.5 0.9
19.6	14.82 .30	37.6 -0.1	16.27 .30	30.5 1.0	42.34 .42	34.1 1.7	39.27 .32	67.7 0.6
29.6	15.00 .15	37.6 +0.2	16.45 .16	29.6 0.7	42.72 .32	36.1 2.1	39.47 .17	67.3 -0.3
Feb. 8.5	15.12 .09	37.9 0.5	16.58 .11	29.0 0.4	42.99 .21	38.4 2.4	39.62 .12	67.2 0.0
18.5	15.19 +.04	38.5 +0.7	16.66 +.06	28.7 -0.2	43.15 +.10	40.9 +2.6	39.72 +.07	67.3 +0.3
28.5	15.21 -.01	39.3 0.9	16.69 +.01	28.7 0.0	43.20 .00	43.6 2.7	39.77 +.02	67.7 0.5
Mar. 10.5	15.18 .05	40.3 1.0	16.68 -.03	28.8 +0.2	43.14 -.11	46.3 2.7	39.77 -.02	68.3 0.7
20.4	15.10 .09	41.3 1.0	16.63 .07	29.1 0.4	42.98 .30	49.0 2.6	39.72 .06	69.1 0.8
30.4	14.99 .12	42.3 1.0	16.54 .10	29.6 0.5	42.74 .38	51.4 2.3	39.64 .09	70.0 0.9
Apr. 9.4	14.85 -.15	43.4 +1.0	16.43 -.12	30.2 +0.6	42.42 -.34	53.6 +2.0	39.53 -.12	70.9 +0.9
19.3	14.70 .16	44.4 0.9	16.30 .14	30.8 0.6	42.05 .39	55.4 1.6	39.40 .13	71.8 0.9
29.3	14.54 .16	45.2 0.8	16.16 .14	31.4 0.7	41.65 .41	56.8 1.2	39.26 .14	72.7 0.8
May 9.3	14.38 .16	46.0 0.6	16.02 .14	32.1 0.7	41.23 .42	57.7 0.7	39.12 .14	73.5 0.8
19.3	14.22 .15	46.5 0.5	15.88 .13	32.7 0.6	40.80 .42	58.2 +0.2	38.98 .14	74.2 0.6
29.2	14.08 -.13	46.9 +0.2	15.76 -.12	33.3 +0.6	40.40 -.39	58.1 -0.3	38.84 -.14	74.8 +0.5
June 8.2	13.95 .11	47.1 +0.1	15.64 .11	33.9 0.5	40.02 .36	57.6 0.8	38.72 .13	75.2 0.4
18.2	13.85 .09	47.2 0.0	15.54 .09	34.4 0.4	39.68 .32	56.6 1.2	38.62 .11	75.5 0.2
28.2	13.77 .06	47.0 -0.2	15.47 .07	34.8 0.4	39.39 .26	55.2 1.6	38.53 .10	75.7 +0.1
July 8.1	13.72 .04	46.7 0.4	15.41 .04	35.1 0.3	39.15 .20	53.3 2.0	38.46 .08	75.7 -0.1
18.1	13.70 -.01	46.2 -0.6	15.38 -.02	35.3 +0.2	38.98 -.14	51.2 -2.3	38.42 -.05	75.6 -0.2
28.1	13.70 +.02	45.6 0.7	15.37 .00	35.4 0.0	38.87 .07	48.7 2.6	38.40 .03	75.3 0.4
Aug. 7.0	13.74 .05	44.8 0.9	15.38 +.03	35.4 -0.1	38.83 -.01	46.0 2.8	38.41 -.01	74.8 0.5
17.0	13.80 .08	43.8 1.0	15.42 .06	35.3 0.2	38.86 +.07	43.1 3.0	38.44 +.02	74.2 0.7
27.0	13.90 .11	42.7 1.2	15.49 .08	35.0 0.4	38.96 .14	40.0 3.1	38.50 .05	73.4 0.9
Sept. 6.0	14.02 +.14	41.4 -1.3	15.59 +.11	34.5 -0.6	39.13 +.21	36.9 -3.1	38.59 +.02	72.4 -1.1
15.9	14.18 .17	40.0 1.5	15.72 .15	33.8 0.8	39.38 .28	33.7 3.1	38.72 .11	71.2 1.2
25.9	14.37 .21	38.5 1.6	15.88 .18	32.9 1.0	39.70 .36	30.6 3.0	38.88 .14	69.9 1.4
Oct. 5.9	14.60 .24	36.8 1.7	16.08 .21	31.8 1.2	40.09 .42	27.6 2.9	39.07 .17	68.4 1.6
15.9	14.85 .27	35.1 1.8	16.31 .24	30.5 1.4	40.55 .49	24.8 2.7	39.29 .21	66.7 1.7
25.8	15.14 +.30	33.3 -1.8	16.56 +.27	29.0 -1.6	41.08 +.55	22.3 -2.4	39.55 +.24	64.9 -1.8
Nov. 4.8	15.45 .32	31.5 1.8	16.85 .29	27.3 1.7	41.65 .59	20.0 2.1	39.84 .27	63.1 1.9
14.8	15.78 .24	29.7 1.7	17.15 .31	25.6 1.8	42.27 .63	18.2 1.6	40.15 .30	61.2 1.9
24.7	16.13 .25	28.1 1.6	17.47 .29	23.7 1.6	42.91 .65	16.7 1.2	40.48 .22	59.3 1.8
Dec. 4.7	16.48 .24	26.5 1.4	17.79 .22	21.9 1.8	43.58 .66	15.8 0.7	40.82 .23	57.5 1.7
14.7	16.82 +.33	25.2 -1.2	18.12 +.29	20.1 -1.7	44.23 +.64	15.4 -0.1	41.16 +.34	55.8 -1.6
24.7	17.15 .21	24.2 0.9	18.42 .30	18.5 1.6	44.87 .61	15.5 +0.4	41.48 .23	54.4 1.3
34.6	17.44 +.28	23.4 -0.6	18.71 +.27	17.0 -1.3	45.45 +.56	16.2 +1.0	41.79 +.21	53.2 -1.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 Draconis (H.)		$\rho$ Leonis.		$\eta$ Argus.		$l$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 10 <sup>m</sup> 25	<sup>°</sup> +76 <sup>'</sup> 17	<sup>h</sup> 10 <sup>m</sup> 26	<sup>°</sup> + 9 <sup>'</sup> 53	<sup>h</sup> 10 <sup>m</sup> 40	<sup>°</sup> -59 <sup>'</sup> 4	<sup>h</sup> 10 <sup>m</sup> 43	<sup>°</sup> +11 <sup>'</sup> 8
(Dec.30.6)	18.97 +.95	55.0 +0.9	46.21 +.99	43.3 -1.7	38.48 +.44	38.4 -2.8	13.50 +.30	63.0 -1.7
Jan. 9.6	19.88 .85	56.2 1.5	46.49 .96	41.7 1.4	38.90 .38	41.4 3.2	13.79 .37	61.4 1.5
	19.6	20.67 .71	57.9 2.0	46.73 .99	40.4 1.2	39.25 .39	44.7 3.4	14.04 .33
	20.6	21.32 .56	60.1 2.4	46.93 .18	39.3 1.0	39.53 .94	48.2 3.6	14.26 .19
Feb. 8.5	21.80 .39	62.7 2.7	47.08 .13	38.5 0.7	39.74 .17	51.9 3.7	14.43 .15	58.2 0.6
	18.5	22.09 +.90	65.6 +2.9	47.19 +.06	38.0 -0.4	39.87 +.09	55.6 -3.6	14.55 +.10
	28.5	22.20 +.09	68.6 3.0	47.24 +.03	37.7 -0.1	39.92 +.01	59.2 3.5	14.62 .05
Mar. 10.5	22.13 -.16	71.6 3.0	47.25 -.01	37.7 +0.1	39.89 -.06	62.7 3.4	14.65 +.01	57.6 +0.2
	20.4	21.88 .33	74.5 2.8	47.23 .05	37.9 0.3	39.80 .12	65.9 3.1	14.64 -.03
	30.4	21.47 .48	77.2 2.6	47.16 .08	38.3 0.4	39.65 .18	68.9 2.8	14.59 .06
Apr. 9.4	20.93 -.59	79.6 +2.2	47.07 -.10	38.8 +0.5	39.44 -.33	71.5 -2.4	14.51 -.09	58.9 +0.6
	19.4	20.29 .68	81.7 1.8	46.96 .19	39.3 0.6	39.20 .96	73.7 2.0	14.41 .11
	29.3	19.56 .75	83.2 1.3	46.83 .13	40.0 0.7	38.92 .99	75.5 1.6	14.29 .12
May 9.3	18.79 .78	84.2 0.8	46.70 .13	40.7 0.7	38.61 .31	76.9 1.1	14.17 .13	61.0 0.7
	19.3	18.00 .78	84.7 +0.2	46.57 .13	41.3 0.7	38.20 .39	77.8 0.6	14.04 .13
	29.3	17.22 -.76	84.7 -0.3	46.45 -.12	42.0 +0.6	37.96 -.33	78.1 -0.1	13.91 -.12
June 8.2	16.48 .71	84.1 0.9	46.33 .11	42.6 0.6	37.64 .39	78.0 +0.4	13.80 .11	63.1 0.6
	18.2	15.79 .65	83.0 1.3	46.23 .10	43.2 0.6	37.32 .31	77.3 0.9	13.69 .10
	28.2	15.18 .57	81.4 1.8	46.14 .08	43.7 0.5	37.02 .29	76.2 1.3	13.59 .09
July 8.1	14.66 .47	79.3 2.2	46.07 .06	44.1 0.4	36.75 .96	74.6 1.8	13.51 .07	64.6 0.3
	18.1	14.24 -.36	76.9 -2.6	46.02 -.04	44.5 +0.3	36.50 -.32	72.7 +2.2	13.45 -.05
	28.1	13.93 .94	74.1 2.9	45.99 -.08	44.7 +0.2	36.30 .18	70.3 2.4	13.41 .03
Aug. 7.1	13.75 -.12	71.1 3.1	45.98 +.01	44.8 0.0	36.15 .13	67.7 2.7	13.38 -.01	65.1 -0.1
	17.0	13.69 .00	67.8 3.3	46.00 .03	44.8 -0.1	36.05 -.07	64.9 2.8	13.39 +.02
	27.0	13.76 +.13	64.4 3.4	46.04 .06	44.6 0.3	36.02 .00	62.1 2.9	13.42 .04
Sept. 6.0	13.96 +.27	61.0 -3.5	46.12 +.09	44.2 -0.5	36.05 +.07	59.2 +2.8	13.47 +.07	64.2 -0.6
	16.0	14.29 .40	57.5 3.4	46.22 .19	43.6 0.7	36.15 .14	56.4 2.7	13.56 .11
	25.9	14.76 .52	54.1 3.3	46.36 .15	42.8 0.9	36.33 .39	53.8 2.4	13.68 .14
Oct. 5.9	15.34 .65	50.9 3.1	46.53 .19	41.8 1.1	36.59 .39	51.6 2.1	13.84 .17	61.5 1.2
	15.9	16.05 .76	47.8 2.9	46.74 .22	40.6 1.4	36.91 .35	49.8 1.7	14.04 .21
	25.8	16.86 +.86	45.1 -2.6	46.98 +.25	39.1 -1.6	37.30 +.41	48.5 +1.0	14.26 +.24
Nov. 4.8	17.77 .95	42.7 2.2	47.24 .98	37.4 1.7	37.74 .46	47.8 +0.4	14.52 .27	56.9 1.8
	14.8	18.75 1.02	40.8 1.7	47.54 .30	35.6 1.8	38.22 .49	47.6 -0.2	14.81 .30
	24.7	19.81 1.07	39.3 1.2	47.85 .32	33.8 1.9	38.72 .51	48.2 0.9	15.12 .29
Dec. 4.7	20.89 1.08	38.4 -0.6	48.18 .32	31.8 1.9	39.24 .51	49.3 1.4	15.45 .33	51.1 2.0
	14.7	21.96 1.06	38.0 0.0	48.50 +.22	29.9 -1.9	39.75 +.50	51.0 -2.0	15.77 +.22
	24.7	23.00 1.01	38.3 +0.6	48.82 .30	28.1 1.7	40.24 .47	53.3 2.5	16.10 .31
	34.6	23.98 +.92	39.2 +1.2	49.11 +.28	26.4 -1.6	40.68 +.42	56.1 -3.0	16.40 +.29

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Majoris.		$\delta$ Leonis.		$\delta$ Crateris.		$\epsilon$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 10 <sup>m</sup> 56	+62° 21'	<sup>h</sup> 11 <sup>m</sup> 8	+21° 8'	<sup>h</sup> 11 <sup>m</sup> 13	-14° 9'	<sup>h</sup> 11 <sup>m</sup> 22	+3° 28'
(Dec. 30.7)	<sup>s</sup> 37.70 +.56	56.8 0.0	<sup>s</sup> 0.03 +.32	61.2 -1.5	<sup>s</sup> 36.37 +.31	23.3 -2.4	<sup>s</sup> 1.99 +.31	76.4 -2.0
Jan. 9.7	38.24 .51	57.2 +0.6	0.34 .30	59.9 1.1	36.67 .98	25.6 2.3	2.29 .99	74.5 1.8
19.6	38.72 .45	58.1 1.9	0.63 .37	58.9 0.8	36.94 .35	28.0 2.3	2.56 .36	72.8 1.7
29.6	39.14 .37	59.5 1.6	0.87 .32	58.3 0.5	37.17 .31	30.2 2.2	2.80 .32	71.2 1.5
Feb. 8.6	39.47 .29	61.4 2.1	1.07 .18	58.0 -0.1	37.36 .17	32.4 2.1	3.00 .18	70.0 1.1
18.5	39.71 +.19	63.6 +2.4	1.23 +.13	58.0 +0.1	37.50 +.12	34.3 -1.8	3.16 +.13	69.0 -0.9
28.5	39.85 +.10	66.1 2.6	1.33 .06	58.4 0.5	37.60 .08	36.1 1.6	3.27 .09	68.3 0.6
Mar. 10.5	39.90 .00	68.8 2.7	1.39 +.03	59.1 0.8	37.66 +.05	37.6 1.4	3.33 .05	67.8 0.3
20.5	39.86 -.09	71.5 2.7	1.40 -.01	59.9 0.9	37.67 .00	38.8 1.1	3.36 +.01	67.6 -0.1
30.4	39.73 .17	74.2 2.6	1.37 .04	61.0 1.1	37.65 -.04	39.8 0.9	3.35 -.03	67.6 +0.1
Apr. 9.4	39.53 -.23	76.6 +2.4	1.31 -.06	62.1 +1.1	37.60 -.06	40.6 -0.6	3.31 -.05	67.9 +0.3
19.4	39.27 .98	78.9 2.1	1.22 .10	63.2 1.1	37.52 .00	41.1 0.4	3.24 .08	68.2 0.4
29.3	38.96 .39	80.8 1.7	1.11 .12	64.3 1.1	37.42 .10	41.4 -0.1	3.15 .00	68.7 0.5
May 9.3	38.62 .35	82.2 1.9	0.98 .13	65.4 1.0	37.31 .11	41.4 +0.1	3.05 .10	69.3 0.6
19.3	38.27 .36	83.3 0.8	0.85 .13	66.4 0.9	37.20 .12	41.2 0.3	2.94 .11	70.0 0.7
29.3	37.91 -.35	83.8 +0.3	0.72 -.13	67.2 +0.8	37.08 -.12	40.9 +0.5	2.83 -.11	70.7 +0.7
June 8.2	37.56 .34	84.0 -0.2	0.59 .12	67.9 0.6	36.96 .12	40.3 0.6	2.71 .11	71.4 0.7
18.2	37.23 .32	83.5 0.6	0.47 .12	68.4 0.4	36.84 .12	39.6 0.8	2.60 .11	72.1 0.7
28.2	36.93 .29	82.7 1.1	0.36 .10	68.7 +0.2	36.72 .11	38.7 0.9	2.50 .10	72.7 0.6
July 8.2	36.66 .24	81.4 1.5	0.26 .09	68.9 0.0	36.62 .10	37.7 1.0	2.40 .09	73.4 0.6
18.1	36.44 -.20	79.7 -1.9	0.18 -.08	68.8 -0.2	36.53 -.08	36.6 +1.1	2.32 -.08	74.0 +0.5
28.1	36.26 .15	77.6 2.2	0.11 .06	68.6 0.4	36.46 .07	35.4 1.2	2.25 .06	74.5 0.5
Aug. 7.1	36.14 .10	75.2 2.5	0.07 .03	68.1 0.6	36.40 .05	34.2 1.2	2.19 .04	74.9 0.4
17.0	36.07 -.04	72.5 2.8	0.05 -.01	67.4 0.8	36.36 -.02	33.0 1.1	2.16 -.02	75.2 +0.2
27.0	36.06 +.02	69.6 3.0	0.05 +.02	66.6 1.0	36.35 .00	31.9 1.0	2.15 .00	75.3 0.0
Sept. 6.0	36.11 +.09	66.4 -3.2	0.08 +.05	65.5 -1.2	36.37 +.04	30.9 +0.9	2.16 +.03	75.2 -0.2
16.0	36.23 .15	63.2 3.2	0.15 .08	64.2 1.4	36.43 .06	30.1 0.7	2.21 .06	75.0 0.4
25.9	36.42 .22	60.0 3.2	0.25 .12	62.7 1.6	36.51 .11	29.6 0.4	2.29 .10	74.5 0.6
Oct. 5.9	36.67 .29	56.7 3.2	0.39 .16	61.0 1.8	36.64 .15	29.3 +0.1	2.41 .14	73.8 0.9
15.9	37.00 .36	53.5 3.1	0.57 .20	59.1 1.9	36.81 .19	29.3 -0.2	2.57 .18	72.8 1.1
25.9	37.39 +.42	50.5 -2.9	0.78 +.22	57.1 -2.1	37.02 +.22	29.7 -0.6	2.76 +.21	71.5 -1.4
Nov. 4.8	37.84 .48	47.7 2.6	1.04 .27	55.0 2.2	37.26 .26	30.5 0.9	3.00 .24	70.0 1.6
14.8	38.35 .53	45.3 2.3	1.32 .20	52.8 2.2	37.54 .29	31.6 1.3	3.26 .28	68.3 1.8
24.8	38.90 .56	43.2 2.0	1.63 .22	50.6 2.1	37.84 .31	33.0 1.6	3.55 .30	66.4 2.0
Dec. 4.7	39.47 .59	41.6 1.4	1.97 .24	48.5 2.0	38.16 .32	34.8 1.9	3.87 .29	64.4 2.0
14.7	40.07 +.59	40.4 -0.9	2.31 +.24	46.6 -1.9	38.49 +.22	36.8 -2.1	4.19 +.22	62.3 -2.1
24.7	40.66 .58	39.8 -0.3	2.65 .23	44.8 1.6	38.82 .29	39.0 2.2	4.51 .22	60.3 2.0
34.7	41.22 +.55	39.8 +0.3	2.97 +.21	43.3 -1.3	39.13 +.20	41.3 -2.3	4.83 +.20	58.3 -1.9



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\lambda$ Draconis.		$\nu$ Leonis.		$\beta$ Leonis.		$\gamma$ Ursæ Majoris.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 11 24	+69° 57'	<sup>h</sup> <sup>m</sup> 11 31	— 0° 11'	<sup>h</sup> <sup>m</sup> 11 43	+15° 12'	<sup>h</sup> <sup>m</sup> 11 47	+54° 19'
(Dec.30.7)	<sup>s</sup> 33.61 +.74	34.8 —0.1	<sup>s</sup> 4.24 +.31	24.2 —2.1	<sup>s</sup> 11.97 +.32	44.8 —1.8	<sup>s</sup> 46.56 +.42	43.7 —0.9
Jan. 9.7	34.33 .69	35.1 +0.5	4.54 .39	26.2 2.0	12.28 .30	43.1 1.5	47.03 .46	43.2 —0.3
	19.6 34.99 .69	35.9 1.1	4.82 .36	28.1 1.8	12.58 .28	41.7 1.9	47.47 .42	43.2 +0.3
	29.6 35.58 .54	37.3 1.7	5.06 .23	29.8 1.6	12.84 .24	40.7 0.9	47.87 .37	43.8 0.9
Feb. 8.6	36.06 .43	39.3 2.1	5.27 .18	31.3 1.3	13.06 .20	40.0 0.6	48.22 .31	44.9 1.4
	18.5 36.44 +.31	41.6 +2.5	5.43 +.14	32.5 —1.1	13.25 +.16	39.6 —0.3	48.49 +.24	46.5 +1.8
	28.5 36.69 .19	44.3 2.8	5.55 .10	33.5 0.8	13.38 .11	39.5 +0.1	48.70 .17	48.5 2.1
Mar. 10.5	36.82 +.06	47.2 2.9	5.62 .05	34.1 0.6	13.47 .07	39.8 0.4	48.83 .09	50.8 2.4
	20.5 36.89 —.06	50.1 2.9	5.66 +.02	34.6 0.3	13.52 +.03	40.3 0.6	48.88 +.02	53.3 2.5
	30.4 36.70 .17	53.1 2.9	5.66 —.02	34.8 —0.1	13.52 —.01	41.0 0.8	48.87 —.04	55.9 2.6
Apr. 9.4	36.48 —.27	55.8 +2.7	5.62 —.06	34.7 +0.1	13.50 —.04	41.9 +0.9	48.80 —.10	58.5 +2.5
	19.4 36.16 .35	58.4 2.4	5.57 .07	34.5 0.3	13.44 .07	42.9 1.0	48.67 .15	61.0 2.4
	29.4 35.77 .42	60.6 2.0	5.48 .09	34.2 0.4	13.36 .09	43.9 1.0	48.49 .19	63.2 2.1
May 9.3	35.32 .47	62.3 1.5	5.39 .10	33.7 0.5	13.27 .10	45.0 1.0	48.28 .22	65.2 1.8
	19.3 34.83 .50	63.7 1.1	5.29 .11	33.2 0.6	13.16 .11	46.0 1.0	48.05 .24	66.8 1.4
	29.3 34.33 —.51	64.5 +0.6	5.18 —.11	32.6 +0.6	13.04 —.11	46.9 +0.9	47.80 —.26	68.0 +1.0
June 8.3	33.81 .51	64.8 0.0	5.06 .11	31.9 0.7	12.92 .12	47.7 0.8	47.54 .26	68.8 0.6
	18.2 33.31 .49	64.5 —0.5	4.95 .11	31.2 0.7	12.80 .12	48.4 0.6	47.28 .25	69.2 +0.1
	28.2 32.84 .46	63.8 1.0	4.85 .10	30.5 0.7	12.69 .11	49.0 0.5	47.03 .24	69.1 —0.3
July 8.2	32.40 .41	62.5 1.5	4.75 .09	29.8 0.7	12.58 .10	49.4 0.3	46.79 .23	68.5 0.8
	18.1 32.02 —.36	60.8 —1.9	4.66 —.08	29.1 +0.7	12.48 —.09	49.6 +0.3	46.57 —.20	67.5 —1.2
	28.1 31.68 .30	58.7 2.3	4.59 .07	28.4 0.6	12.39 .08	49.7 0.0	46.38 .18	66.1 1.6
Aug. 7.1	31.42 .23	56.1 2.7	4.52 .05	27.9 0.5	12.32 .06	49.6 —0.2	46.22 .14	64.3 2.0
	17.1 31.22 .15	53.3 3.0	4.48 —.03	27.4 0.4	12.27 .04	49.2 0.4	46.10 .11	62.2 2.3
	27.0 31.11 —.07	50.2 3.2	4.46 .00	27.1 0.2	12.24 —.02	48.7 0.6	46.01 .06	59.7 2.6
Sept. 6.0	31.08 +.01	46.9 —3.4	4.46 +.02	26.9 +0.1	12.23 +.01	48.0 —0.9	45.97 —.02	57.0 —2.8
	16.0 31.13 .10	43.4 3.5	4.50 .05	26.9 —0.2	12.26 .04	47.0 1.1	45.98 +.04	54.0 3.0
	26.0 31.29 .20	39.9 3.5	4.57 .09	27.2 0.4	12.32 .08	45.8 1.3	46.04 .00	50.9 3.2
Oct. 5.9	31.53 .29	36.4 3.5	4.68 .12	27.7 0.6	12.41 .12	44.4 1.5	46.17 .15	47.7 3.3
	15.9 31.67 .20	32.9 3.4	4.83 .17	28.5 0.9	12.55 .16	42.7 1.7	46.35 .21	44.4 3.3
	25.9 32.30 +.48	29.6 —3.2	5.02 +.21	29.6 —1.2	12.73 +.20	40.9 —1.9	46.59 +.27	41.2 —3.2
Nov. 4.8	32.83 .56	26.5 2.9	5.25 .24	30.9 1.4	12.95 .24	38.9 2.1	46.90 .23	38.0 3.1
	14.8 33.43 .64	23.8 2.5	5.51 .27	32.5 1.7	13.21 .27	36.8 2.2	47.26 .28	35.1 2.8
	24.8 34.10 .70	21.4 2.1	5.80 .30	34.3 1.9	13.49 .30	34.6 2.2	47.66 .23	32.4 2.5
Dec. 4.8	34.82 .74	19.5 1.6	6.11 .31	36.3 2.0	13.80 .28	32.4 2.2	48.11 .26	30.0 2.1
	14.7 35.58 +.76	18.2 —1.1	6.43 +.22	38.4 —2.1	14.13 +.23	30.2 —2.1	48.58 +.48	28.1 —1.7
	24.7 36.34 .76	17.5 —0.4	6.75 .22	40.5 2.1	14.46 .23	28.2 1.9	49.07 .26	26.7 1.2
	34.7 37.09 +.73	17.3 +0.2	7.07 +.21	42.5 —2.0	14.79 +.23	26.4 —1.7	49.56 +.42	25.8 —0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Virginis.		$\delta$ Draconis (H.)		$\gamma$ Corvi.		$\beta$ Chamæleontis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 11 59	<sup>m</sup> + 9 21	<sup>h</sup> 12 6	<sup>m</sup> +78° 14'	<sup>h</sup> 12 9	<sup>m</sup> -16° 54'	<sup>h</sup> 12 11	<sup>m</sup> -78° 40'
(Dec.30.7)	<sup>s</sup> 21.38 +.33	<sup>s</sup> 72.1 -2.0	<sup>s</sup> 46.32 1.19	<sup>s</sup> 58.0 -0.4	<sup>s</sup> 54.14 +.34	<sup>s</sup> 8.5 -2.2	<sup>s</sup> 41.54 1.22	<sup>s</sup> 5.6 -1.4
Jan. 9.6	21.69 .31	70.3 1.7	47.50 1.15	57.9 +0.2	54.47 .31	10.7 2.2	42.72 1.14	7.3 2.0
19.6	21.99 .28	68.7 1.5	48.63 1.08	58.4 0.9	54.77 .29	13.0 2.3	43.82 1.04	9.6 2.5
29.5	22.26 .25	67.3 1.2	49.66 .97	59.6 1.5	55.05 .26	15.2 2.2	44.81 .92	12.3 2.9
Feb. 8.5	22.49 .21	66.2 0.9	50.57 .83	61.4 2.0	55.28 .22	17.4 2.1	45.65 .77	15.4 3.2
18.5	22.68 +.17	65.5 -0.6	51.32 +.66	63.7 +2.5	55.48 +.18	19.4 -1.9	46.35 +.61	18.6 -3.5
28.4	22.83 .13	65.1 -0.3	51.89 .47	66.3 2.8	55.64 .14	21.3 1.8	46.87 .44	22.4 3.7
Mar. 10.4	22.93 .08	65.0 0.0	52.26 .27	69.3 3.0	55.76 .09	23.0 1.6	47.23 .27	26.2 3.8
20.4	22.99 .04	65.1 +0.3	52.43 +.06	72.4 3.1	55.83 .06	24.4 1.3	47.42 +.10	29.9 3.7
30.4	23.02 +.01	65.5 0.5	52.38 -1.14	75.5 3.1	55.87 +.02	25.6 1.1	47.44 -0.06	33.7 3.7
Apr. 9.3	23.01 -0.02	66.1 +0.7	52.15 -0.32	78.6 +3.0	55.87 -0.01	26.6 -0.8	47.29 -0.22	37.3 -3.5
19.3	22.97 .05	66.9 0.8	51.74 .49	81.4 2.7	55.85 .04	27.3 0.6	47.00 .37	40.6 3.3
29.3	22.91 .07	67.7 0.6	51.18 .63	84.0 2.4	55.80 .06	27.8 0.4	46.56 .50	43.8 3.0
May 9.3	22.83 .09	68.5 0.9	50.48 .75	86.2 2.0	55.72 .08	28.1 -0.2	45.99 .63	46.5 2.6
19.2	22.74 .10	69.4 0.9	49.68 .83	87.9 1.5	55.64 .09	28.2 0.0	45.31 .73	48.9 2.3
29.2	22.63 -0.11	70.3 +0.8	48.82 -0.89	89.2 +1.0	55.54 -0.10	28.0 +0.2	44.53 -0.22	50.9 -1.7
June 8.2	22.52 .11	71.1 0.8	47.90 .92	89.8 +0.4	55.43 .11	27.7 0.4	43.67 .89	52.3 1.2
18.1	22.41 .11	71.9 0.7	46.97 .93	90.0 -0.1	55.31 .12	27.2 0.6	42.75 .94	53.2 0.7
28.1	22.30 .11	72.5 0.6	46.05 .90	89.6 0.7	55.20 .12	26.6 0.7	41.79 .96	53.6 -0.1
July 8.1	22.19 .11	73.1 0.5	45.16 .86	88.6 1.2	55.08 .12	25.8 0.9	40.83 .95	53.4 +0.4
18.1	22.09 -0.10	73.5 +0.4	44.33 -0.81	87.1 -1.7	54.96 -0.11	24.8 +1.0	39.89 -0.22	52.7 +1.0
28.0	21.99 .09	73.8 0.2	43.57 .71	85.2 2.2	54.85 .10	23.8 1.1	39.00 .86	51.5 1.5
Aug. 7.0	21.91 .07	74.0 +0.1	42.91 .61	82.8 2.6	54.75 .09	22.7 1.1	38.18 .76	49.7 2.0
17.0	21.85 .06	74.0 -0.1	42.34 .50	80.0 3.0	54.67 .07	21.6 1.1	37.47 .64	47.5 2.4
27.0	21.80 .03	73.8 0.3	41.91 .37	76.9 3.2	54.60 .05	20.5 1.1	36.89 .50	45.0 2.7
Sept. 5.9	21.78 -0.01	73.4 -0.5	41.60 -0.23	73.5 -3.5	54.57 -0.02	19.5 +1.0	36.47 -0.33	42.1 +2.9
15.9	21.79 +0.03	72.8 0.7	41.45 -0.08	69.9 3.6	54.57 +0.02	18.6 0.8	36.24 -0.13	39.1 3.1
25.9	21.83 .06	71.9 1.0	41.44 +0.07	66.2 3.7	54.60 .05	17.9 0.6	36.21 +0.07	36.0 3.1
Oct. 5.8	21.91 .10	70.8 1.2	41.59 .24	62.4 3.7	54.67 .09	17.3 0.4	36.38 .29	33.0 3.0
15.8	22.04 .14	69.5 1.4	41.91 .40	58.7 3.7	54.79 .14	17.1 +0.1	36.76 .49	30.1 2.8
25.8	22.20 +.18	68.0 -1.7	42.40 +.56	55.1 -3.5	54.95 +.16	17.2 -0.3	37.35 +.68	27.4 +2.4
Nov. 4.8	22.40 .22	66.2 1.9	43.04 .72	51.7 3.3	55.15 .23	17.7 0.6	38.13 .85	25.2 2.0
14.7	22.64 .26	64.2 2.0	43.84 .87	48.6 2.9	55.40 .26	18.5 1.0	39.06 1.00	23.5 1.5
24.7	22.92 .29	62.2 2.1	44.77 .99	45.8 2.5	55.68 .29	19.6 1.3	40.13 1.12	22.3 0.9
Dec. 4.7	23.22 .31	60.0 2.2	45.82 1.09	43.6 2.0	55.99 .32	21.1 1.6	41.30 1.19	21.7 +0.3
14.7	23.54 +.32	57.9 -2.1	46.95 1.16	41.8 -1.4	56.32 +.33	22.8 -1.9	42.52 1.23	21.8 -0.4
24.6	23.87 .33	55.8 2.0	48.13 1.19	40.7 0.8	56.65 .33	24.8 2.1	43.75 1.22	22.5 1.0
34.6	24.19 +.32	53.8 -1.9	49.33 1.18	40.2 -0.1	56.98 +.33	27.0 -2.2	44.97 1.18	23.8 -1.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Virginis.		$\alpha^1$ Crucis.		$\beta$ Corvi.		$\kappa$ Draconis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 12 14	<sup>°</sup> <sup>'</sup> — 0 1	<sup>h</sup> <sup>m</sup> 12 20	<sup>°</sup> <sup>'</sup> — 62 27	<sup>h</sup> <sup>m</sup> 12 28	<sup>°</sup> <sup>'</sup> — 22 45	<sup>h</sup> <sup>m</sup> 12 28	<sup>°</sup> <sup>'</sup> + 70 24
(Dec.30.7)	<sup>s</sup> 1.70 +.38	<sup>"</sup> 41.9 —2.1	<sup>s</sup> 13.42 +.57	<sup>"</sup> 25.1 —1.5	<sup>s</sup> 21.38 +.35	<sup>"</sup> 32.0 —2.0	<sup>s</sup> 32.79 +.78	<sup>"</sup> 60.1 —1.0
Jan. 9.7	2.02 .31	43.9 2.0	13.99 .55	26.9 2.1	21.72 .33	34.1 2.2	33.54 .75	59.5 —0.3
19.7	2.31 .39	45.8 1.8	14.52 .51	29.3 2.6	22.04 .31	36.4 2.3	34.28 .71	59.6 +0.3
29.7	2.59 .37	47.5 1.6	15.00 .45	32.1 2.9	22.33 .28	38.7 2.3	34.97 .65	60.3 1.0
Feb. 8.6	2.82 .29	49.0 1.4	15.42 .39	35.1 3.2	22.59 .24	41.0 2.3	35.58 .57	61.6 1.6
18.6	3.02 +.18	50.3 —1.1	15.77 +.31	38.4 —3.4	22.81 +.20	43.3 —2.2	36.11 +.47	63.4 +2.1
28.6	3.18 .14	51.2 0.8	16.05 .24	41.8 3.5	22.99 .16	45.4 2.0	36.52 .36	65.7 2.5
Mar. 10.5	3.30 .10	51.9 0.5	16.25 .18	45.3 3.5	23.13 .12	47.3 1.8	36.83 .24	68.4 2.8
20.5	3.38 .06	52.3 0.3	16.37 .09	48.8 3.4	23.22 .08	49.1 1.6	37.00 +.19	71.3 3.0
30.5	3.42 +.02	52.5 —0.1	16.43 +.02	52.1 3.3	23.28 .04	50.6 1.4	37.06 .00	74.4 3.0
Apr. 9.5	3.43 —.01	52.5 +0.1	16.42 —.04	55.3 —3.1	23.31 +.01	52.0 —1.2	37.00 —.12	77.4 +3.0
19.4	3.41 .03	52.2 0.3	16.34 .10	58.3 2.8	23.30 —.02	53.0 1.0	36.83 .22	80.4 2.8
29.4	3.36 .05	51.9 0.4	16.21 .16	61.0 2.5	23.26 .05	53.9 0.7	36.56 .31	83.1 2.6
May 9.4	3.30 .06	51.4 0.5	16.02 .21	63.3 2.2	23.21 .07	54.5 0.5	36.21 .38	85.5 2.2
19.4	3.22 .09	50.8 0.6	15.79 .25	65.3 1.8	23.13 .06	54.9 —0.3	35.79 .44	87.5 1.8
29.3	3.12 —.10	50.1 +0.7	15.52 —.22	66.8 —1.3	23.03 —.10	55.0 0.0	35.31 —.49	89.1 +1.3
June 8.3	3.02 .10	49.5 0.7	15.21 .32	67.9 0.9	22.93 .11	54.9 +0.2	34.81 .52	90.2 0.8
18.3	2.92 .11	48.7 0.7	14.88 .34	68.5 —0.4	22.81 .12	54.6 0.4	34.28 .53	90.8 +0.3
28.2	2.81 .11	48.0 0.7	14.53 .35	68.7 +0.1	22.69 .13	54.1 0.6	33.75 .53	90.8 —0.2
July 8.2	2.70 .11	47.3 0.7	14.18 .35	68.3 0.6	22.56 .13	53.4 0.9	33.23 .51	90.3 0.7
18.2	2.59 —.10	46.7 +0.6	13.83 —.34	67.4 +1.1	22.43 —.13	52.5 +1.0	32.73 —.48	89.3 —1.3
28.2	2.49 .09	46.1 0.6	13.50 .32	66.1 1.5	22.30 .12	51.4 1.1	32.26 .45	87.8 1.7
Aug. 7.1	2.40 .08	45.6 0.5	13.19 .22	64.4 1.9	22.19 .11	50.3 1.2	31.83 .40	85.8 2.2
17.1	2.32 .07	45.2 0.4	12.92 .25	62.3 2.3	22.08 .09	49.0 1.3	31.47 .34	83.4 2.6
27.1	2.27 .04	44.9 +0.2	12.69 .19	59.9 2.5	22.00 .07	47.7 1.3	31.16 .27	80.7 2.9
Sept. 6.1	2.23 —.02	44.7 0.0	12.54 —.12	57.3 +2.7	21.94 —.04	46.5 +1.2	30.93 —.19	77.6 —3.2
16.0	2.23 +.01	44.8 —0.2	12.45 —.04	54.5 2.8	21.92 —.01	45.3 1.1	30.79 .10	74.3 3.4
26.0	2.26 .05	45.1 0.4	12.44 +.04	51.7 2.7	21.93 +.03	44.2 1.0	30.73 —.01	70.7 3.6
Oct. 6.0	2.32 .09	45.6 0.6	12.53 .13	49.1 2.6	21.99 .08	43.4 0.7	30.77 +.09	67.0 3.7
16.0	2.43 .13	46.4 0.9	12.70 .22	46.6 2.4	22.09 .12	42.8 0.4	30.92 .20	63.3 3.7
25.9	2.58 +.17	47.4 —1.2	12.97 +.31	44.4 +2.0	22.24 +.17	42.5 +0.1	31.17 +.30	59.6 —3.6
Nov. 4.9	2.78 .21	48.8 1.4	13.32 .32	42.6 1.5	22.43 .22	42.6 —0.3	31.52 .41	56.1 3.5
14.9	3.01 .25	50.3 1.7	13.75 .46	41.3 1.0	22.67 .26	43.0 0.6	31.98 .50	52.7 3.2
24.8	3.27 .28	52.1 1.9	14.24 .52	40.5 +0.5	22.95 .29	43.9 1.0	32.53 .59	49.7 2.8
Dec. 4.8	3.57 .30	54.0 2.0	14.78 .56	40.4 —0.1	23.26 .32	45.0 1.3	33.17 .66	47.0 2.4
14.8	3.88 +.32	56.1 —2.1	15.35 +.52	40.8 —0.7	23.59 +.34	46.6 —1.7	33.86 +.72	44.0 —1.9
24.8	4.21 .32	58.2 2.1	15.94 .58	41.8 1.3	23.93 .34	48.4 1.9	34.60 .75	43.3 1.3
34.7	4.53 +.32	60.3 —2.1	16.52 +.56	43.4 —1.9	24.28 +.33	50.4 —2.1	35.37 +.78	42.3 —0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	32° Camelop. (H.)		α° Can. Venaticorum.		θ Virginis.		α Virginis. (Spica.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 12 48	<sup>°</sup> +84 1'	<sup>h</sup> 12 50	<sup>°</sup> +38 55'	<sup>h</sup> 13 3	<sup>°</sup> - 4 55'	<sup>h</sup> 13 19	<sup>°</sup> -10 33'
(Dec.30.7)	<sup>s</sup> 10.88 2.17	<sup>"</sup> 57.0 -0.8	<sup>s</sup> 38.46 +.38	<sup>"</sup> 69.4 -1.8	<sup>s</sup> 59.85 +.33	<sup>"</sup> 27.6 -2.1	<sup>s</sup> 8.17 +.33	<sup>"</sup> 34.6 -1.9
Jan. 9.7	13.08 2.90	56.5 -0.9	38.84 .38	67.8 1.3	60.17 .38	29.7 2.0	8.50 .38	36.5 2.0
19.7	15.27 2.14	56.7 +0.5	39.21 .38	66.7 0.8	60.49 .31	31.7 1.9	8.82 .31	38.5 2.0
29.7	17.36 2.00	57.5 1.1	39.56 .33	66.2 -0.3	60.78 .98	33.5 1.8	9.13 .99	40.4 1.9
Feb. 8.6	19.27 1.79	58.9 1.7	39.88 .30	66.1 +0.9	61.05 .25	35.2 1.6	9.41 .27	42.2 1.7
18.6	20.94 1.52	61.0 +2.2	40.16 +.36	66.6 +0.7	61.29 +.21	36.6 -1.3	9.66 +.23	43.9 -1.6
28.6	22.31 1.19	63.4 2.6	40.39 .21	67.6 1.3	61.49 .18	37.8 1.0	9.88 .20	45.3 1.3
Mar. 10.6	23.33 .83	66.3 2.9	40.58 .16	69.0 1.6	61.66 .15	38.8 0.8	10.06 .16	46.5 1.1
20.5	23.97 .45	69.3 3.1	40.71 .11	70.8 1.9	61.79 .11	39.5 0.6	10.20 .13	47.5 0.9
30.5	24.21 +.06	72.5 3.9	40.79 .06	72.7 2.1	61.88 .08	40.0 0.3	10.31 .09	48.3 0.7
Apr. 9.5	24.07 -.33	75.7 +3.1	40.82 +.01	74.9 +2.2	61.94 +.04	40.2 -0.1	10.39 +.06	48.9 -0.4
19.4	23.55 .69	78.7 2.9	40.81 -.03	77.2 2.2	61.97 +.01	40.2 +0.1	10.43 +.03	49.2 0.2
29.4	22.68 1.02	81.6 2.7	40.76 .07	79.4 2.2	61.97 -.01	40.0 0.2	10.45 .00	49.4 -0.1
May 9.4	21.51 1.30	84.1 2.3	40.68 .10	81.5 2.1	61.95 .03	39.7 0.4	10.44 -.02	49.4 +0.1
19.4	20.07 1.54	86.2 1.9	40.56 .19	83.5 1.9	61.90 .05	39.3 0.5	10.41 .04	49.2 0.2
29.3	18.43 1.72	87.8 +1.3	40.43 -.14	85.2 +1.6	61.84 -.07	38.8 +0.5	10.36 -.06	49.0 +0.3
June 8.3	16.63 1.85	88.8 0.8	40.28 .16	86.7 1.3	61.76 .08	38.2 0.6	10.29 .08	48.6 0.4
18.3	14.73 1.92	89.4 +0.3	40.12 .17	87.8 0.9	61.67 .10	37.6 0.6	10.20 .09	48.1 0.5
28.3	12.79 1.94	89.4 -0.3	39.95 .17	88.5 0.6	61.56 .11	36.9 0.7	10.10 .11	47.5 0.6
July 8.2	10.84 1.92	88.8 0.8	39.77 .18	88.9 +0.2	61.45 .12	36.2 0.7	9.99 .12	47.0 0.6
18.2	8.95 1.84	87.7 -1.4	39.60 -.17	88.9 -0.2	61.33 -.12	35.6 +0.7	9.86 -.12	46.3 +0.7
28.2	7.15 1.73	86.1 1.9	39.42 .16	88.5 0.6	61.21 .12	34.9 0.6	9.74 .13	45.6 0.7
Aug. 7.1	5.49 1.57	84.0 2.3	39.26 .15	87.8 0.9	61.09 .11	34.3 0.6	9.61 .12	44.9 0.7
17.1	4.01 1.38	81.4 2.7	39.12 .13	86.6 1.3	60.98 .10	33.7 0.5	9.49 .12	44.2 0.7
27.1	2.73 1.16	78.5 3.1	38.99 .11	85.2 1.6	60.89 .09	33.3 0.4	9.38 .10	43.5 0.6
Sept. 6.1	1.69 -.91	75.2 -3.4	38.90 -.08	83.3 -2.0	60.81 -.07	32.9 +0.3	9.29 -.08	42.9 +0.5
16.0	0.91 .64	71.8 3.6	38.83 -.05	81.2 2.3	60.76 -.04	32.7 +0.1	9.22 .05	42.4 0.4
26.0	0.42 .34	68.1 3.7	38.80 .00	78.8 2.5	60.74 .00	32.7 -0.1	9.19 -.02	42.1 +0.2
Oct. 6.0	0.23 -.02	64.3 3.8	38.83 +.04	76.1 2.7	60.76 +.04	32.9 0.3	9.19 +.02	42.0 0.0
16.0	0.37 +.30	60.5 3.8	38.89 .09	73.3 2.9	60.81 .08	33.4 0.6	9.24 .07	42.0 -0.2
25.9	0.83 +.63	56.7 -3.7	39.01 +.14	70.3 -3.1	60.92 +.13	34.1 -0.8	9.32 +.11	42.4 -0.5
Nov. 4.9	1.63 .95	53.1 3.5	39.18 .19	67.2 3.1	61.07 .17	35.1 1.1	9.46 .16	43.0 0.8
14.9	2.74 1.27	49.7 3.2	39.40 .25	64.2 3.0	61.26 .21	36.3 1.4	9.65 .21	43.9 1.0
24.8	4.17 1.56	46.7 2.8	39.67 .29	61.1 2.9	61.49 .25	37.8 1.6	9.88 .25	45.1 1.3
Dec. 4.8	5.86 1.81	44.0 2.4	39.99 .33	58.3 2.7	61.77 .28	39.5 1.8	10.14 .28	46.5 1.6
14.8	7.78 2.00	41.9 -1.8	40.33 +.36	55.7 -2.4	62.06 +.31	41.4 -1.9	10.44 +.31	48.2 -1.7
24.8	9.87 2.14	40.4 1.2	40.70 .38	53.4 2.1	62.38 .22	43.4 2.0	10.75 .22	50.0 1.9
34.7	12.07 2.22	39.5 -0.6	41.09 +.39	51.5 -1.7	62.70 +.33	45.4 -2.1	11.08 +.33	52.0 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\zeta$ Virginis.		$\eta$ Ursæ Majoris.		$\eta$ Bootis.		$\beta$ Centauri.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 13 28	<sup>°</sup> — 0 0'	<sup>h</sup> 13 42	<sup>°</sup> +49 52'	<sup>h</sup> 13 49	<sup>°</sup> +18 58'	<sup>h</sup> 13 55	<sup>°</sup> —59 48'
(Dec.30.8)	<sup>s</sup> 49.91 +.39	26.3 —2.0	<sup>s</sup> 59.43 +.42	62.0 —2.2	<sup>s</sup> 12.11 +.33	24.1 —2.3	<sup>s</sup> 43.13 +.56	43.9 —0.4
Jan. 9.8	50.23 .39	28.3 2.0	59.85 .43	60.1 1.6	12.43 .33	22.0 2.0	43.69 .56	44.6 0.9
19.7	50.55 .31	30.2 1.8	60.28 .42	58.7 1.1	12.76 .32	20.1 1.7	44.25 .55	45.8 1.4
29.7	50.85 .30	32.0 1.6	60.70 .41	57.9 —0.5	13.08 .31	18.7 1.3	44.79 .53	47.4 1.8
Feb. 8.7	51.14 .27	33.5 1.4	61.10 .38	57.8 +0.2	13.38 .29	17.6 0.9	45.31 .49	49.4 2.2
18.7	51.39 +.24	34.8 —1.1	61.47 +.35	58.2 +0.7	13.65 +.28	17.0 —0.4	45.78 +.45	51.8 —2.5
28.6	51.61 .20	35.7 0.9	61.79 .30	59.3 1.3	13.90 .23	16.7 0.0	46.21 .40	54.3 2.7
Mar. 10.6	51.80 .17	36.4 0.5	62.07 .25	60.8 1.8	14.11 .19	17.0 +0.4	46.58 .34	57.1 2.8
20.6	51.95 .13	36.8 —0.3	62.28 .19	62.2 2.2	14.28 .15	17.5 0.8	46.90 .29	60.0 2.9
30.5	52.06 .10	37.0 0.0	62.44 .13	65.1 2.5	14.42 .12	18.4 1.1	47.15 .23	63.0 3.0
Apr. 9.5	52.24 +.07	36.8 +0.2	62.55 +.07	67.7 +2.7	14.52 +.08	19.6 +1.3	47.35 +.17	66.0 —2.9
19.5	52.20 .04	36.5 0.4	62.59 +.02	70.5 2.7	14.58 .05	21.0 1.5	47.48 .10	68.9 2.8
29.5	52.22 +.01	36.1 0.5	62.59 —.03	73.2 2.7	14.62 +.02	22.6 1.6	47.56 +.05	71.6 2.7
May 9.4	52.22 —.01	35.5 0.6	62.53 .08	75.9 2.6	14.62 —.01	24.2 1.6	47.58 —.01	74.3 2.5
19.4	52.19 .04	34.8 0.7	62.43 .12	78.5 2.4	14.60 .04	25.8 1.6	47.54 .07	76.7 2.3
29.4	52.14 —.06	34.0 +0.8	62.30 —.15	80.8 +2.1	14.55 —.06	27.3 +1.5	47.44 —.12	78.8 —2.0
June 8.3	52.07 .08	33.3 0.8	62.13 .18	82.7 1.8	14.48 .08	28.8 1.4	47.29 .17	80.6 1.6
18.3	51.99 .09	32.5 0.8	61.93 .21	84.4 1.4	14.39 .10	30.1 1.2	47.10 .22	82.1 1.3
28.3	51.89 .10	31.8 0.7	61.71 .23	85.6 1.0	14.28 .12	31.2 1.0	46.86 .26	83.1 0.9
July 8.3	51.78 .11	31.0 0.7	61.47 .24	86.3 0.6	14.16 .13	32.1 0.8	46.58 .29	83.8 —0.4
18.2	51.66 —.12	30.4 +0.6	61.23 —.25	86.7 +0.1	14.02 —.14	32.7 +0.5	46.28 —.31	84.0 0.0
28.2	51.54 .12	29.8 0.5	60.98 .25	86.5 —0.4	13.88 .14	33.2 +0.3	45.95 .33	83.8 +0.5
Aug. 7.2	51.41 .12	29.3 0.4	60.73 .24	85.9 0.8	13.73 .14	33.3 0.0	45.62 .33	83.1 0.9
17.2	51.29 .11	28.9 0.3	60.49 .23	84.9 1.3	13.59 .14	33.2 —0.3	45.30 .32	82.0 1.3
27.1	51.18 .10	28.6 +0.2	60.27 .21	83.4 1.7	13.46 .13	32.8 0.5	44.99 .29	80.5 1.7
Sept. 6.1	51.08 —.08	28.5 0.0	60.07 —.18	81.5 —2.1	13.34 —.11	32.1 —0.8	44.71 —.25	78.6 +2.0
16.1	51.01 .06	28.6 —0.2	59.90 .14	79.2 2.5	13.23 .09	31.1 1.1	44.46 .20	76.5 2.2
26.0	50.96 —.03	28.9 0.4	59.78 .10	76.5 2.8	13.16 .05	29.8 1.4	44.32 .13	74.2 2.4
Oct. 6.0	50.95 +.01	29.3 0.6	59.70 —.05	73.4 3.1	13.13 —.02	28.3 1.7	44.22 —.05	71.7 2.5
16.0	50.98 .05	30.1 0.8	59.68 +.01	70.3 3.3	13.13 +.02	26.5 1.9	44.21 +.03	69.2 —2.4
26.0	51.06 +.10	31.0 —1.1	59.72 +.07	67.0 —3.4	13.18 +.07	24.4 —2.2	44.29 +.12	66.8 +2.3
Nov. 4.9	51.18 .15	32.3 1.3	59.83 .14	63.5 3.5	13.27 .12	22.2 2.3	44.45 .21	64.6 2.1
14.9	51.35 .19	33.7 1.6	60.00 .20	60.0 3.5	13.42 .17	19.7 2.5	44.71 .30	62.7 1.7
24.9	51.57 .23	35.4 1.8	60.23 .26	56.5 3.4	13.61 .21	17.2 2.6	45.05 .38	61.2 1.3
Dec. 4.8	51.82 .27	37.3 1.9	60.52 .32	53.2 3.2	13.85 .25	14.5 2.6	45.47 .45	60.0 0.9
14.8	52.10 +.22	39.3 —2.0	60.87 +.37	50.2 —2.9	14.12 +.22	12.0 —2.5	45.94 +.50	59.4 +0.4
24.8	52.41 .31	41.3 2.1	61.26 .40	47.5 2.5	14.43 .31	9.5 2.3	46.46 .53	59.3 —0.1
34.8	52.73 +.32	43.4 —2.1	61.67 +.42	45.2 —2.0	14.75 +.33	7.2 —2.1	47.01 +.56	59.7 —0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Draconis.		$\alpha$ Bootis. (Arcturus.)		$\theta$ Bootis.		$\rho$ Bootis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 14 1	+64° 55'	<sup>h</sup> <sup>m</sup> 14 10	+19° 46'	<sup>h</sup> <sup>m</sup> 14 21	+52° 22'	<sup>h</sup> <sup>m</sup> 14 26	+30° 52'
(Dec. 30.8)	<sup>s</sup> 14.38 +.56	18.1 -2.2	<sup>s</sup> 24.40 +.31	50.0 -2.4	<sup>s</sup> 15.44 +.40	46.4 -2.5	<sup>s</sup> 51.62 +.32	38.0 -2.5
Jan. 9.8	14.96 .59	16.2 1.6	24.72 .32	47.7 2.1	15.86 .43	44.1 2.0	51.95 .34	27.6 2.1
19.8	15.56 .60	14.9 1.0	25.04 .32	45.7 1.8	16.30 .44	42.4 1.4	52.30 .34	25.7 1.7
29.7	16.15 .59	14.3 -0.3	25.36 .31	44.1 1.4	16.74 .44	41.3 0.8	52.64 .34	24.2 1.3
Feb. 8.7	16.73 .56	14.3 +0.3	25.67 .32	42.9 1.0	17.17 .42	40.8 -0.2	52.97 .32	23.2 0.7
18.7	17.27 +.51	15.0 +1.0	25.95 +.37	42.2 -0.5	17.58 +.39	40.9 +0.4	53.28 +.30	22.7 -0.2
28.7	17.76 .45	16.3 1.6	26.21 .34	41.9 -0.1	17.95 .35	41.6 1.0	53.57 .37	22.8 +0.3
Mar. 10.6	18.17 .38	18.2 2.1	26.44 .31	42.0 +0.3	18.28 .30	43.0 1.6	53.82 .31	23.4 0.8
20.6	18.52 .30	20.5 2.5	26.63 .17	42.5 0.7	18.55 .25	44.8 2.0	54.04 .30	24.4 1.2
30.6	18.77 .31	23.2 2.8	26.78 .14	43.5 1.0	18.77 .19	47.0 2.4	54.22 .16	25.8 1.6
Apr. 9.5	18.94 +.12	26.1 +3.0	26.90 +.10	44.6 +1.3	18.94 +.13	49.6 +2.7	54.36 +.12	27.6 +1.2
19.5	19.01 +.03	29.2 3.1	26.99 .07	46.1 1.5	19.04 .08	52.4 2.8	54.47 .09	29.6 2.1
29.5	19.00 -.05	32.3 3.1	27.04 .04	47.6 1.6	19.09 +.02	55.3 2.9	54.54 .05	31.8 2.2
May 9.5	18.91 .13	35.3 2.9	27.06 +.01	49.3 1.7	19.08 -.03	58.2 2.8	54.56 +.01	34.0 2.2
19.4	18.74 .20	38.2 2.7	27.05 -.02	51.0 1.6	19.02 .08	61.0 2.7	54.56 -.02	36.3 2.2
29.4	18.51 -.36	40.7 +2.3	27.02 -.05	52.6 +1.6	18.91 -.13	63.6 +2.5	54.52 -.05	38.4 +2.1
June 8.4	18.21 .32	42.9 2.0	26.96 .07	54.1 1.4	18.76 .17	65.9 2.2	54.46 .08	40.4 1.9
18.4	17.87 .36	44.7 1.5	26.88 .09	55.5 1.3	18.57 .20	67.9 1.8	54.37 .10	42.2 1.7
28.3	17.49 .39	46.0 1.1	26.77 .11	56.7 1.1	18.35 .23	69.5 1.4	54.25 .13	43.7 1.4
July 8.3	17.08 .42	46.8 +0.5	26.65 .13	57.6 0.9	18.10 .26	70.7 0.9	54.11 .15	45.0 1.1
18.3	16.66 -.43	47.1 0.0	26.51 -.14	58.4 +0.6	17.84 -.37	71.4 +0.5	53.95 -.16	45.9 +0.7
28.2	16.22 .44	46.9 -0.5	26.37 .15	58.8 0.3	17.55 .38	71.6 0.0	53.78 .18	46.4 +0.4
Aug. 7.2	15.78 .43	46.1 1.0	26.21 .16	59.0 +0.1	17.27 .39	71.4 -0.5	53.60 .18	46.6 0.0
17.2	15.36 .41	44.9 1.5	26.05 .15	58.9 -0.2	16.98 .38	70.7 1.0	53.42 .18	46.4 -0.4
27.2	14.96 .38	43.2 2.0	25.90 .15	58.5 0.5	16.71 .37	69.5 1.4	53.24 .17	45.9 0.7
Sept. 6.1	14.60 -.34	41.0 -2.4	25.76 -.13	57.9 -0.8	16.45 -.34	67.8 -1.9	53.07 -.16	44.9 -1.1
16.1	14.28 .39	38.4 2.8	25.64 .11	56.9 1.1	16.22 .31	65.7 2.3	52.92 .14	43.6 1.5
26.1	14.03 .32	35.4 3.1	25.55 .08	55.6 1.4	16.02 .17	63.2 2.6	52.79 .11	42.0 1.8
Oct. 6.1	13.84 .15	32.1 3.4	25.49 -.04	54.0 1.7	15.88 .12	60.4 3.0	52.70 .07	40.0 2.1
16.0	13.73 -.07	28.6 3.6	25.47 .00	52.2 2.0	15.79 -.06	57.3 3.3	52.65 -.03	37.7 2.4
26.0	13.70 +.02	25.0 -3.7	25.49 +.05	50.1 -2.2	15.76 .00	53.9 -3.5	52.65 +.02	35.2 -2.7
Nov. 5.0	13.77 .12	21.2 3.8	25.56 .10	47.8 2.4	15.79 +.06	50.4 3.6	52.70 .08	32.4 2.9
14.9	13.94 .31	17.4 3.7	25.68 .15	45.2 2.6	15.89 .14	46.7 3.6	52.80 .13	29.4 3.0
24.9	14.20 .30	13.7 3.6	25.85 .19	42.6 2.7	16.08 .22	43.1 3.6	52.96 .18	26.4 3.0
Dec. 4.9	14.55 .39	10.2 3.3	26.07 .34	39.9 2.7	16.33 .28	39.6 3.4	53.17 .23	23.4 3.0
14.9	14.98 +.47	7.1 -3.0	26.33 +.37	37.2 -2.6	16.64 +.33	36.3 -3.2	53.42 +.27	20.4 -2.9
24.8	15.48 .53	4.3 2.5	26.61 .30	34.6 2.5	17.00 .38	33.2 2.8	53.71 .30	17.5 2.7
34.8	16.03 +.58	2.0 -2.0	26.92 +.32	32.1 -2.3	17.40 +.42	30.6 -2.4	54.03 +.33	15.0 -2.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	5 Ursæ Minoris.		$\alpha^2$ Centauri.		$\epsilon$ Bootis.		$\alpha^2$ Libræ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sub>14</sub> <sup>m</sup> <sub>27</sub>	<sup>°</sup> <sub>+76</sub> <sup>'</sup> <sub>12</sub>	<sup>h</sup> <sub>14</sub> <sup>m</sup> <sub>31</sub>	<sup>°</sup> <sub>-60</sub> <sup>'</sup> <sub>21</sub>	<sup>h</sup> <sub>14</sub> <sup>m</sup> <sub>39</sub>	<sup>°</sup> <sub>+27</sub> <sup>'</sup> <sub>33</sub>	<sup>h</sup> <sub>14</sub> <sup>m</sup> <sub>44</sub>	<sup>°</sup> <sub>-15</sub> <sup>'</sup> <sub>33</sub>
(Dec.30.8)	<sup>s</sup> <sub>42.01</sub> <sup>+</sup> <sub>.84</sub>	<sup>"</sup> <sub>12.8</sub> <sup>-</sup> <sub>2.3</sub>	<sup>s</sup> <sub>48.71</sub> <sup>+</sup> <sub>.54</sub>	<sup>"</sup> <sub>25.9</sub> <sup>+</sup> <sub>0.1</sub>	<sup>s</sup> <sub>57.07</sub> <sup>+</sup> <sub>.31</sub>	<sup>"</sup> <sub>30.0</sub> <sup>-</sup> <sub>2.5</sub>	<sup>s</sup> <sub>30.63</sub> <sup>+</sup> <sub>.31</sub>	<sup>"</sup> <sub>39.0</sub> <sup>-</sup> <sub>1.5</sub>
Jan. 9.8	<sup>s</sup> <sub>42.90</sub> <sup>+</sup> <sub>.99</sub>	<sup>"</sup> <sub>10.7</sub> <sup>+</sup> <sub>1.7</sub>	<sup>s</sup> <sub>49.25</sub> <sup>+</sup> <sub>.55</sub>	<sup>"</sup> <sub>26.1</sub> <sup>-</sup> <sub>0.4</sub>	<sup>s</sup> <sub>57.39</sub> <sup>+</sup> <sub>.39</sub>	<sup>"</sup> <sub>27.6</sub> <sup>+</sup> <sub>2.2</sub>	<sup>s</sup> <sub>30.95</sub> <sup>+</sup> <sub>.39</sub>	<sup>"</sup> <sub>40.5</sub> <sup>+</sup> <sub>1.5</sub>
19.8	<sup>s</sup> <sub>43.86</sub> <sup>+</sup> <sub>.97</sub>	<sup>"</sup> <sub>9.3</sub> <sup>+</sup> <sub>1.0</sub>	<sup>s</sup> <sub>49.81</sub> <sup>+</sup> <sub>.56</sub>	<sup>"</sup> <sub>26.8</sub> <sup>+</sup> <sub>0.9</sub>	<sup>s</sup> <sub>57.72</sub> <sup>+</sup> <sub>.33</sub>	<sup>"</sup> <sub>25.5</sub> <sup>+</sup> <sub>1.8</sub>	<sup>s</sup> <sub>31.28</sub> <sup>+</sup> <sub>.39</sub>	<sup>"</sup> <sub>42.1</sub> <sup>+</sup> <sub>1.6</sub>
29.7	<sup>s</sup> <sub>44.85</sub> <sup>+</sup> <sub>.98</sub>	<sup>"</sup> <sub>8.6</sub> <sup>-</sup> <sub>0.4</sub>	<sup>s</sup> <sub>50.37</sub> <sup>+</sup> <sub>.55</sub>	<sup>"</sup> <sub>27.9</sub> <sup>+</sup> <sub>1.3</sub>	<sup>s</sup> <sub>58.06</sub> <sup>+</sup> <sub>.33</sub>	<sup>"</sup> <sub>23.9</sub> <sup>+</sup> <sub>1.4</sub>	<sup>s</sup> <sub>31.60</sub> <sup>+</sup> <sub>.39</sub>	<sup>"</sup> <sub>43.7</sub> <sup>+</sup> <sub>1.6</sub>
Feb. 8.7	<sup>s</sup> <sub>45.83</sub> <sup>+</sup> <sub>.96</sub>	<sup>"</sup> <sub>8.5</sub> <sup>+</sup> <sub>0.3</sub>	<sup>s</sup> <sub>50.91</sub> <sup>+</sup> <sub>.53</sub>	<sup>"</sup> <sub>29.4</sub> <sup>+</sup> <sub>1.7</sub>	<sup>s</sup> <sub>58.38</sub> <sup>+</sup> <sub>.39</sub>	<sup>"</sup> <sub>22.8</sub> <sup>+</sup> <sub>0.9</sub>	<sup>s</sup> <sub>31.91</sub> <sup>+</sup> <sub>.31</sub>	<sup>"</sup> <sub>45.3</sub> <sup>+</sup> <sub>1.5</sub>
18.7	<sup>s</sup> <sub>46.77</sub> <sup>+</sup> <sub>.99</sub>	<sup>"</sup> <sub>9.1</sub> <sup>+</sup> <sub>0.9</sub>	<sup>s</sup> <sub>51.42</sub> <sup>+</sup> <sub>.49</sub>	<sup>"</sup> <sub>31.3</sub> <sup>-</sup> <sub>2.0</sub>	<sup>s</sup> <sub>58.69</sub> <sup>+</sup> <sub>.30</sub>	<sup>"</sup> <sub>22.1</sub> <sup>-</sup> <sub>0.4</sub>	<sup>s</sup> <sub>32.21</sub> <sup>+</sup> <sub>.39</sub>	<sup>"</sup> <sub>46.8</sub> <sup>-</sup> <sub>1.4</sub>
28.7	<sup>s</sup> <sub>47.65</sub> <sup>+</sup> <sub>.99</sub>	<sup>"</sup> <sub>10.3</sub> <sup>+</sup> <sub>1.5</sub>	<sup>s</sup> <sub>51.89</sub> <sup>+</sup> <sub>.45</sub>	<sup>"</sup> <sub>33.4</sub> <sup>+</sup> <sub>2.3</sub>	<sup>s</sup> <sub>58.98</sub> <sup>+</sup> <sub>.27</sub>	<sup>"</sup> <sub>22.0</sub> <sup>+</sup> <sub>0.1</sub>	<sup>s</sup> <sub>32.49</sub> <sup>+</sup> <sub>.26</sub>	<sup>"</sup> <sub>48.1</sub> <sup>+</sup> <sub>1.3</sub>
Mar. 10.6	<sup>s</sup> <sub>48.42</sub> <sup>+</sup> <sub>.71</sub>	<sup>"</sup> <sub>12.1</sub> <sup>+</sup> <sub>2.0</sub>	<sup>s</sup> <sub>52.31</sub> <sup>+</sup> <sub>.40</sub>	<sup>"</sup> <sub>35.8</sub> <sup>+</sup> <sub>2.5</sub>	<sup>s</sup> <sub>59.23</sub> <sup>+</sup> <sub>.24</sub>	<sup>"</sup> <sub>22.4</sub> <sup>+</sup> <sub>0.6</sub>	<sup>s</sup> <sub>32.74</sub> <sup>+</sup> <sub>.24</sub>	<sup>"</sup> <sub>49.3</sub> <sup>+</sup> <sub>1.1</sub>
20.6	<sup>s</sup> <sub>49.06</sub> <sup>+</sup> <sub>.57</sub>	<sup>"</sup> <sub>14.4</sub> <sup>+</sup> <sub>2.5</sub>	<sup>s</sup> <sub>52.68</sub> <sup>+</sup> <sub>.34</sub>	<sup>"</sup> <sub>38.4</sub> <sup>+</sup> <sub>2.6</sub>	<sup>s</sup> <sub>59.46</sub> <sup>+</sup> <sub>.21</sub>	<sup>"</sup> <sub>23.2</sub> <sup>+</sup> <sub>1.0</sub>	<sup>s</sup> <sub>32.97</sub> <sup>+</sup> <sub>.21</sub>	<sup>"</sup> <sub>50.3</sub> <sup>+</sup> <sub>0.9</sub>
30.6	<sup>s</sup> <sub>49.56</sub> <sup>+</sup> <sub>.49</sub>	<sup>"</sup> <sub>17.2</sub> <sup>+</sup> <sub>2.9</sub>	<sup>s</sup> <sub>53.00</sub> <sup>+</sup> <sub>.29</sub>	<sup>"</sup> <sub>41.1</sub> <sup>+</sup> <sub>2.7</sub>	<sup>s</sup> <sub>59.65</sub> <sup>+</sup> <sub>.17</sub>	<sup>"</sup> <sub>24.5</sub> <sup>+</sup> <sub>1.4</sub>	<sup>s</sup> <sub>33.16</sub> <sup>+</sup> <sub>.18</sub>	<sup>"</sup> <sub>51.2</sub> <sup>+</sup> <sub>0.8</sub>
Apr. 9.6	<sup>s</sup> <sub>49.91</sub> <sup>+</sup> <sub>.27</sub>	<sup>"</sup> <sub>20.2</sub> <sup>+</sup> <sub>3.1</sub>	<sup>s</sup> <sub>53.26</sub> <sup>+</sup> <sub>.23</sub>	<sup>"</sup> <sub>43.9</sub> <sup>-</sup> <sub>2.8</sub>	<sup>s</sup> <sub>59.80</sub> <sup>+</sup> <sub>.14</sub>	<sup>"</sup> <sub>26.1</sub> <sup>+</sup> <sub>1.7</sub>	<sup>s</sup> <sub>33.32</sub> <sup>+</sup> <sub>.15</sub>	<sup>"</sup> <sub>51.8</sub> <sup>-</sup> <sub>0.6</sub>
19.5	<sup>s</sup> <sub>50.10</sub> <sup>+</sup> <sub>.11</sub>	<sup>"</sup> <sub>23.3</sub> <sup>+</sup> <sub>3.9</sub>	<sup>s</sup> <sub>53.46</sub> <sup>+</sup> <sub>.17</sub>	<sup>"</sup> <sub>46.7</sub> <sup>+</sup> <sub>2.8</sub>	<sup>s</sup> <sub>59.92</sub> <sup>+</sup> <sub>.10</sub>	<sup>"</sup> <sub>27.9</sub> <sup>+</sup> <sub>1.9</sub>	<sup>s</sup> <sub>33.46</sub> <sup>+</sup> <sub>.19</sub>	<sup>"</sup> <sub>52.3</sub> <sup>+</sup> <sub>0.4</sub>
29.5	<sup>s</sup> <sub>50.12</sub> <sup>-</sup> <sub>.05</sub>	<sup>"</sup> <sub>26.5</sub> <sup>+</sup> <sub>3.2</sub>	<sup>s</sup> <sub>53.60</sub> <sup>+</sup> <sub>.11</sub>	<sup>"</sup> <sub>49.4</sub> <sup>+</sup> <sub>2.7</sub>	<sup>s</sup> <sub>60.00</sub> <sup>+</sup> <sub>.06</sub>	<sup>"</sup> <sub>29.9</sub> <sup>+</sup> <sub>2.1</sub>	<sup>s</sup> <sub>33.57</sub> <sup>+</sup> <sub>.09</sub>	<sup>"</sup> <sub>52.7</sub> <sup>+</sup> <sub>0.3</sub>
May 9.5	<sup>s</sup> <sub>49.99</sub> <sup>+</sup> <sub>.21</sub>	<sup>"</sup> <sub>29.7</sub> <sup>+</sup> <sub>3.1</sub>	<sup>s</sup> <sub>53.68</sub> <sup>+</sup> <sub>.05</sub>	<sup>"</sup> <sub>52.1</sub> <sup>+</sup> <sub>2.5</sub>	<sup>s</sup> <sub>60.05</sub> <sup>+</sup> <sub>.03</sub>	<sup>"</sup> <sub>32.1</sub> <sup>+</sup> <sub>2.1</sub>	<sup>s</sup> <sub>33.64</sub> <sup>+</sup> <sub>.06</sub>	<sup>"</sup> <sub>52.9</sub> <sup>-</sup> <sub>0.1</sub>
19.4	<sup>s</sup> <sub>49.71</sub> <sup>+</sup> <sub>.35</sub>	<sup>"</sup> <sub>32.7</sub> <sup>+</sup> <sub>2.9</sub>	<sup>s</sup> <sub>53.69</sub> <sup>-</sup> <sub>.01</sub>	<sup>"</sup> <sub>54.5</sub> <sup>+</sup> <sub>2.4</sub>	<sup>s</sup> <sub>60.06</sub> <sup>+</sup> <sub>.00</sub>	<sup>"</sup> <sub>34.3</sub> <sup>+</sup> <sub>2.1</sub>	<sup>s</sup> <sub>33.69</sub> <sup>+</sup> <sub>.03</sub>	<sup>"</sup> <sub>52.9</sub> <sup>+</sup> <sub>0.0</sub>
29.4	<sup>s</sup> <sub>49.30</sub> <sup>-</sup> <sub>.47</sub>	<sup>"</sup> <sub>35.4</sub> <sup>+</sup> <sub>2.6</sub>	<sup>s</sup> <sub>53.65</sub> <sup>-</sup> <sub>.07</sub>	<sup>"</sup> <sub>56.8</sub> <sup>-</sup> <sub>2.3</sub>	<sup>s</sup> <sub>60.04</sub> <sup>-</sup> <sub>.03</sub>	<sup>"</sup> <sub>36.4</sub> <sup>+</sup> <sub>2.0</sub>	<sup>s</sup> <sub>33.71</sub> <sup>+</sup> <sub>.01</sub>	<sup>"</sup> <sub>52.9</sub> <sup>+</sup> <sub>0.1</sub>
June 8.4	<sup>s</sup> <sub>48.76</sub> <sup>+</sup> <sub>.59</sub>	<sup>"</sup> <sub>37.8</sub> <sup>+</sup> <sub>2.2</sub>	<sup>s</sup> <sub>53.55</sub> <sup>+</sup> <sub>.13</sub>	<sup>"</sup> <sub>58.8</sub> <sup>+</sup> <sub>1.9</sub>	<sup>s</sup> <sub>60.00</sub> <sup>+</sup> <sub>.06</sub>	<sup>"</sup> <sub>38.4</sub> <sup>+</sup> <sub>1.9</sub>	<sup>s</sup> <sub>33.70</sub> <sup>-</sup> <sub>.02</sub>	<sup>"</sup> <sub>52.8</sub> <sup>+</sup> <sub>0.2</sub>
18.4	<sup>s</sup> <sub>48.12</sub> <sup>+</sup> <sub>.68</sub>	<sup>"</sup> <sub>39.8</sub> <sup>+</sup> <sub>1.7</sub>	<sup>s</sup> <sub>53.38</sub> <sup>+</sup> <sub>.19</sub>	<sup>"</sup> <sub>60.6</sub> <sup>+</sup> <sub>1.6</sub>	<sup>s</sup> <sub>59.92</sub> <sup>+</sup> <sub>.09</sub>	<sup>"</sup> <sub>40.1</sub> <sup>+</sup> <sub>1.7</sub>	<sup>s</sup> <sub>33.66</sub> <sup>+</sup> <sub>.05</sub>	<sup>"</sup> <sub>52.5</sub> <sup>+</sup> <sub>0.2</sub>
28.3	<sup>s</sup> <sub>47.40</sub> <sup>+</sup> <sub>.76</sub>	<sup>"</sup> <sub>41.2</sub> <sup>+</sup> <sub>1.2</sub>	<sup>s</sup> <sub>53.17</sub> <sup>+</sup> <sub>.24</sub>	<sup>"</sup> <sub>62.0</sub> <sup>+</sup> <sub>1.2</sub>	<sup>s</sup> <sub>59.82</sub> <sup>+</sup> <sub>.11</sub>	<sup>"</sup> <sub>41.7</sub> <sup>+</sup> <sub>1.4</sub>	<sup>s</sup> <sub>33.60</sub> <sup>+</sup> <sub>.06</sub>	<sup>"</sup> <sub>52.3</sub> <sup>+</sup> <sub>0.3</sub>
July 8.3	<sup>s</sup> <sub>46.61</sub> <sup>+</sup> <sub>.81</sub>	<sup>"</sup> <sub>42.2</sub> <sup>+</sup> <sub>0.7</sub>	<sup>s</sup> <sub>52.91</sub> <sup>+</sup> <sub>.28</sub>	<sup>"</sup> <sub>63.0</sub> <sup>+</sup> <sub>0.8</sub>	<sup>s</sup> <sub>59.69</sub> <sup>+</sup> <sub>.14</sub>	<sup>"</sup> <sub>43.0</sub> <sup>+</sup> <sub>1.1</sub>	<sup>s</sup> <sub>33.51</sub> <sup>+</sup> <sub>.10</sub>	<sup>"</sup> <sub>51.9</sub> <sup>+</sup> <sub>0.4</sub>
18.3	<sup>s</sup> <sub>45.77</sub> <sup>-</sup> <sub>.85</sub>	<sup>"</sup> <sub>42.7</sub> <sup>+</sup> <sub>0.2</sub>	<sup>s</sup> <sub>52.61</sub> <sup>-</sup> <sub>.32</sub>	<sup>"</sup> <sub>63.6</sub> <sup>-</sup> <sub>0.4</sub>	<sup>s</sup> <sub>59.55</sub> <sup>-</sup> <sub>.15</sub>	<sup>"</sup> <sub>44.0</sub> <sup>+</sup> <sub>0.8</sub>	<sup>s</sup> <sub>33.40</sub> <sup>-</sup> <sub>.12</sub>	<sup>"</sup> <sub>51.5</sub> <sup>+</sup> <sub>0.4</sub>
28.3	<sup>s</sup> <sub>44.91</sub> <sup>+</sup> <sub>.86</sub>	<sup>"</sup> <sub>42.6</sub> <sup>-</sup> <sub>0.3</sub>	<sup>s</sup> <sub>52.27</sub> <sup>+</sup> <sub>.34</sub>	<sup>"</sup> <sub>63.7</sub> <sup>+</sup> <sub>0.1</sub>	<sup>s</sup> <sub>59.38</sub> <sup>+</sup> <sub>.17</sub>	<sup>"</sup> <sub>44.7</sub> <sup>+</sup> <sub>0.5</sub>	<sup>s</sup> <sub>33.27</sub> <sup>+</sup> <sub>.14</sub>	<sup>"</sup> <sub>51.0</sub> <sup>+</sup> <sub>0.5</sub>
Aug. 7.2	<sup>s</sup> <sub>44.04</sub> <sup>+</sup> <sub>.86</sub>	<sup>"</sup> <sub>42.0</sub> <sup>+</sup> <sub>0.9</sub>	<sup>s</sup> <sub>51.92</sub> <sup>+</sup> <sub>.36</sub>	<sup>"</sup> <sub>63.5</sub> <sup>+</sup> <sub>0.5</sub>	<sup>s</sup> <sub>59.21</sub> <sup>+</sup> <sub>.18</sub>	<sup>"</sup> <sub>45.0</sub> <sup>+</sup> <sub>0.1</sub>	<sup>s</sup> <sub>33.12</sub> <sup>+</sup> <sub>.15</sub>	<sup>"</sup> <sub>50.5</sub> <sup>+</sup> <sub>0.5</sub>
17.2	<sup>s</sup> <sub>43.19</sub> <sup>+</sup> <sub>.84</sub>	<sup>"</sup> <sub>40.9</sub> <sup>+</sup> <sub>1.4</sub>	<sup>s</sup> <sub>51.56</sub> <sup>+</sup> <sub>.36</sub>	<sup>"</sup> <sub>62.8</sub> <sup>+</sup> <sub>0.9</sub>	<sup>s</sup> <sub>59.03</sub> <sup>+</sup> <sub>.18</sub>	<sup>"</sup> <sub>45.0</sub> <sup>-</sup> <sub>0.2</sub>	<sup>s</sup> <sub>32.97</sub> <sup>+</sup> <sub>.15</sub>	<sup>"</sup> <sub>49.9</sub> <sup>+</sup> <sub>0.6</sub>
27.2	<sup>s</sup> <sub>42.37</sub> <sup>+</sup> <sub>.79</sub>	<sup>"</sup> <sub>39.3</sub> <sup>+</sup> <sub>1.9</sub>	<sup>s</sup> <sub>51.21</sub> <sup>+</sup> <sub>.34</sub>	<sup>"</sup> <sub>61.7</sub> <sup>+</sup> <sub>1.3</sub>	<sup>s</sup> <sub>58.85</sub> <sup>+</sup> <sub>.17</sub>	<sup>"</sup> <sub>44.6</sub> <sup>+</sup> <sub>0.6</sub>	<sup>s</sup> <sub>32.82</sub> <sup>+</sup> <sub>.15</sub>	<sup>"</sup> <sub>49.3</sub> <sup>+</sup> <sub>0.6</sub>
Sept. 6.1	<sup>s</sup> <sub>41.60</sub> <sup>-</sup> <sub>.73</sub>	<sup>"</sup> <sub>37.2</sub> <sup>-</sup> <sub>2.3</sub>	<sup>s</sup> <sub>50.88</sub> <sup>-</sup> <sub>.31</sub>	<sup>"</sup> <sub>60.1</sub> <sup>+</sup> <sub>1.7</sub>	<sup>s</sup> <sub>58.68</sub> <sup>-</sup> <sub>.16</sub>	<sup>"</sup> <sub>43.8</sub> <sup>-</sup> <sub>0.9</sub>	<sup>s</sup> <sub>32.67</sub> <sup>-</sup> <sub>.14</sub>	<sup>"</sup> <sub>48.8</sub> <sup>+</sup> <sub>0.6</sub>
16.1	<sup>s</sup> <sub>40.91</sub> <sup>+</sup> <sub>.64</sub>	<sup>"</sup> <sub>34.6</sub> <sup>+</sup> <sub>2.7</sub>	<sup>s</sup> <sub>50.59</sub> <sup>+</sup> <sub>.27</sub>	<sup>"</sup> <sub>58.3</sub> <sup>+</sup> <sub>2.0</sub>	<sup>s</sup> <sub>58.53</sub> <sup>+</sup> <sub>.14</sub>	<sup>"</sup> <sub>42.7</sub> <sup>+</sup> <sub>1.3</sub>	<sup>s</sup> <sub>32.53</sub> <sup>+</sup> <sub>.19</sub>	<sup>"</sup> <sub>48.2</sub> <sup>+</sup> <sub>0.5</sub>
26.1	<sup>s</sup> <sub>40.31</sub> <sup>+</sup> <sub>.54</sub>	<sup>"</sup> <sub>31.7</sub> <sup>+</sup> <sub>3.1</sub>	<sup>s</sup> <sub>50.35</sub> <sup>+</sup> <sub>.20</sub>	<sup>"</sup> <sub>56.2</sub> <sup>+</sup> <sub>2.2</sub>	<sup>s</sup> <sub>58.40</sub> <sup>+</sup> <sub>.11</sub>	<sup>"</sup> <sub>41.3</sub> <sup>+</sup> <sub>1.6</sub>	<sup>s</sup> <sub>32.42</sub> <sup>+</sup> <sub>.10</sub>	<sup>"</sup> <sub>47.8</sub> <sup>+</sup> <sub>0.4</sub>
Oct. 6.1	<sup>s</sup> <sub>39.83</sub> <sup>+</sup> <sub>.49</sub>	<sup>"</sup> <sub>28.5</sub> <sup>+</sup> <sub>3.4</sub>	<sup>s</sup> <sub>50.18</sub> <sup>+</sup> <sub>.13</sub>	<sup>"</sup> <sub>53.8</sub> <sup>+</sup> <sub>2.4</sub>	<sup>s</sup> <sub>58.30</sub> <sup>+</sup> <sub>.08</sub>	<sup>"</sup> <sub>39.6</sub> <sup>+</sup> <sub>1.9</sub>	<sup>s</sup> <sub>32.34</sub> <sup>+</sup> <sub>.06</sub>	<sup>"</sup> <sub>47.4</sub> <sup>+</sup> <sub>0.3</sub>
16.0	<sup>s</sup> <sub>39.47</sub> <sup>+</sup> <sub>.38</sub>	<sup>"</sup> <sub>25.0</sub> <sup>+</sup> <sub>3.6</sub>	<sup>s</sup> <sub>50.08</sub> <sup>-</sup> <sub>.05</sub>	<sup>"</sup> <sub>51.4</sub> <sup>+</sup> <sub>2.4</sub>	<sup>s</sup> <sub>58.24</sub> <sup>-</sup> <sub>.04</sub>	<sup>"</sup> <sub>37.5</sub> <sup>+</sup> <sub>2.2</sub>	<sup>s</sup> <sub>32.30</sub> <sup>-</sup> <sub>.02</sub>	<sup>"</sup> <sub>47.2</sub> <sup>+</sup> <sub>0.1</sub>
26.0	<sup>s</sup> <sub>39.26</sub> <sup>-</sup> <sub>.14</sub>	<sup>"</sup> <sub>21.2</sub> <sup>-</sup> <sub>3.8</sub>	<sup>s</sup> <sub>50.08</sub> <sup>+</sup> <sub>.04</sub>	<sup>"</sup> <sub>49.0</sub> <sup>+</sup> <sub>2.4</sub>	<sup>s</sup> <sub>58.22</sub> <sup>+</sup> <sub>.01</sub>	<sup>"</sup> <sub>35.1</sub> <sup>-</sup> <sub>2.5</sub>	<sup>s</sup> <sub>32.31</sub> <sup>+</sup> <sub>.03</sub>	<sup>"</sup> <sub>47.1</sub> <sup>-</sup> <sub>0.1</sub>
Nov. 5.0	<sup>s</sup> <sub>39.20</sub> <sup>+</sup> <sub>.09</sub>	<sup>"</sup> <sub>17.4</sub> <sup>+</sup> <sub>3.8</sub>	<sup>s</sup> <sub>50.17</sub> <sup>+</sup> <sub>.14</sub>	<sup>"</sup> <sub>46.7</sub> <sup>+</sup> <sub>2.2</sub>	<sup>s</sup> <sub>58.26</sub> <sup>+</sup> <sub>.06</sub>	<sup>"</sup> <sub>32.5</sub> <sup>+</sup> <sub>2.7</sub>	<sup>s</sup> <sub>32.36</sub> <sup>+</sup> <sub>.08</sub>	<sup>"</sup> <sub>47.2</sub> <sup>+</sup> <sub>0.3</sub>
15.0	<sup>s</sup> <sub>39.31</sub> <sup>+</sup> <sub>.19</sub>	<sup>"</sup> <sub>13.6</sub> <sup>+</sup> <sub>3.8</sub>	<sup>s</sup> <sub>50.35</sub> <sup>+</sup> <sub>.23</sub>	<sup>"</sup> <sub>44.5</sub> <sup>+</sup> <sub>2.0</sub>	<sup>s</sup> <sub>58.35</sub> <sup>+</sup> <sub>.12</sub>	<sup>"</sup> <sub>29.7</sub> <sup>+</sup> <sub>2.9</sub>	<sup>s</sup> <sub>32.47</sub> <sup>+</sup> <sub>.13</sub>	<sup>"</sup> <sub>47.6</sub> <sup>+</sup> <sub>0.5</sub>
24.9	<sup>s</sup> <sub>39.58</sub> <sup>+</sup> <sub>.35</sub>	<sup>"</sup> <sub>9.0</sub> <sup>+</sup> <sub>3.7</sub>	<sup>s</sup> <sub>50.63</sub> <sup>+</sup> <sub>.29</sub>	<sup>"</sup> <sub>42.7</sub> <sup>+</sup> <sub>1.7</sub>	<sup>s</sup> <sub>58.49</sub> <sup>+</sup> <sub>.17</sub>	<sup>"</sup> <sub>26.8</sub> <sup>+</sup> <sub>2.9</sub>	<sup>s</sup> <sub>32.63</sub> <sup>+</sup> <sub>.18</sub>	<sup>"</sup> <sub>48.3</sub> <sup>+</sup> <sub>0.7</sub>
Dec. 4.9	<sup>s</sup> <sub>40.02</sub> <sup>+</sup> <sub>.52</sub>	<sup>"</sup> <sub>6.3</sub> <sup>+</sup> <sub>3.4</sub>	<sup>s</sup> <sub>50.98</sub> <sup>+</sup> <sub>.39</sub>	<sup>"</sup> <sub>41.2</sub> <sup>+</sup> <sub>1.3</sub>	<sup>s</sup> <sub>58.68</sub> <sup>+</sup> <sub>.21</sub>	<sup>"</sup> <sub>23.8</sub> <sup>+</sup> <sub>2.9</sub>	<sup>s</sup> <sub>32.83</sub> <sup>+</sup> <sub>.23</sub>	<sup>"</sup> <sub>49.1</sub> <sup>+</sup> <sub>1.0</sub>
14.9	<sup>s</sup> <sub>40.61</sub> <sup>+</sup> <sub>.66</sub>	<sup>"</sup> <sub>3.0</sub> <sup>-</sup> <sub>3.1</sub>	<sup>s</sup> <sub>51.41</sub> <sup>+</sup> <sub>.46</sub>	<sup>"</sup> <sub>40.2</sub> <sup>+</sup> <sub>0.8</sub>	<sup>s</sup> <sub>58.92</sub> <sup>+</sup> <sub>.26</sub>	<sup>"</sup> <sub>20.9</sub> <sup>-</sup> <sub>2.9</sub>	<sup>s</sup> <sub>33.08</sub> <sup>+</sup> <sub>.26</sub>	<sup>"</sup> <sub>50.2</sub> <sup>-</sup> <sub>1.2</sub>
24.8	<sup>s</sup> <sub>41.33</sub> <sup>+</sup> <sub>.78</sub>	<sup>"</sup> <sub>0.2</sub> <sup>+</sup> <sub>2.6</sub>	<sup>s</sup> <sub>51.89</sub> <sup>+</sup> <sub>.51</sub>	<sup>"</sup> <sub>39.6</sub> <sup>+</sup> <sub>0.3</sub>	<sup>s</sup> <sub>59.20</sub> <sup>+</sup> <sub>.29</sub>	<sup>"</sup> <sub>18.1</sub> <sup>+</sup> <sub>2.7</sub>	<sup>s</sup> <sub>33.36</sub> <sup>+</sup> <sub>.29</sub>	<sup>"</sup> <sub>51.5</sub> <sup>+</sup> <sub>1.4</sub>
34.8	<sup>s</sup> <sub>42.17</sub> <sup>+</sup> <sub>.89</sub>	<sup>"</sup> <sub>57.8</sub> <sup>-</sup> <sub>2.1</sub>	<sup>s</sup> <sub>52.42</sub> <sup>+</sup> <sub>.56</sub>	<sup>"</sup> <sub>39.5</sub> <sup>-</sup> <sub>0.2</sub>	<sup>s</sup> <sub>59.50</sub> <sup>+</sup> <sub>.32</sub>	<sup>"</sup> <sub>15.5</sub> <sup>-</sup> <sub>2.7</sub>	<sup>s</sup> <sub>33.67</sub> <sup>+</sup> <sub>.32</sub>	<sup>"</sup> <sub>53.0</sub> <sup>-</sup> <sub>1.5</sub>

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Ursæ Minoris.		$\beta$ Bootis.		$\beta$ Libræ.		$\mu^1$ Bootis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 14 50	<sup>m</sup> +74° 37'	<sup>h</sup> 14 57	<sup>m</sup> +40° 50'	<sup>h</sup> 15 10	<sup>m</sup> — 8° 57'	<sup>h</sup> 15 20	<sup>m</sup> +37° 46'
(Dec.30.8)	<sup>s</sup> 58.44 +.71	<sup>s</sup> 20.4 —2.6	<sup>s</sup> 35.60 +.92	<sup>s</sup> 34.2 —2.8	<sup>s</sup> 48.58 +.29	<sup>s</sup> 21.1 —1.6	<sup>s</sup> 7.50 +.30	<sup>s</sup> 47.6 —2.8
Jan. 9.8	59.20 .80	18.1 2.0	35.94 .35	31.6 2.4	48.88 .30	22.7 1.6	7.81 .32	44.9 2.5
19.8	60.04 .86	16.4 1.4	36.30 .36	29.5 1.9	49.19 .31	24.3 1.6	8.15 .34	42.6 2.1
29.8	60.92 .89	15.3 0.8	36.66 .37	27.9 1.4	49.50 .31	25.9 1.5	8.50 .35	40.7 1.6
Feb. 8.7	61.81 .88	14.8 —0.1	37.03 .38	26.8 0.8	49.81 .30	27.3 1.4	8.85 .35	39.5 1.0
18.7	62.69 +.85	15.1 +0.6	37.38 +.34	26.3 —0.2	50.11 +.29	28.6 —1.2	9.20 +.34	38.7 —0.4
28.7	63.51 .79	16.0 1.2	37.72 .32	26.4 +0.4	50.39 .37	29.7 1.0	9.52 .32	38.6 +0.1
Mar. 10.7	64.25 .70	17.6 1.8	38.02 .28	27.1 1.0	50.65 .25	30.6 0.8	9.83 .29	39.0 0.7
20.6	64.90 .59	19.6 2.3	38.29 .25	28.3 1.5	50.89 .22	31.3 0.5	10.11 .26	40.0 1.2
30.6	65.42 .46	22.2 2.7	38.52 .21	30.0 1.9	51.10 .20	31.7 0.3	10.35 .22	41.5 1.7
Apr. 9.6	65.81 +.22	25.0 +2.9	38.70 +.17	32.1 +2.2	51.28 +.17	31.9 —0.1	10.55 +.18	43.4 +2.1
19.5	66.06 .16	28.1 3.2	38.85 .12	34.5 2.5	51.44 .14	32.0 0.0	10.72 .15	45.6 2.3
29.5	66.17 +.04	31.3 3.2	38.95 .08	37.1 2.6	51.56 .11	31.9 +0.2	10.84 .10	48.1 2.5
May 9.5	66.14 —.10	34.6 3.2	39.00 +.03	39.7 2.7	51.66 .08	31.6 0.3	10.93 .07	50.7 2.6
19.5	65.97 .23	37.7 3.0	39.02 —.01	42.4 2.6	51.73 .06	31.3 0.4	10.97 +.02	53.4 2.6
29.4	65.67 —.36	40.6 +2.8	38.99 —.04	45.0 +2.5	51.77 +.03	30.8 +0.5	10.98 —.02	56.0 +2.5
June 8.4	65.26 .47	43.2 2.4	38.93 .08	47.5 2.3	51.79 .00	30.3 0.5	10.94 .05	58.5 2.4
18.4	64.74 .56	45.4 2.0	38.83 .12	49.7 2.1	51.77 —.03	29.8 0.5	10.87 .09	60.8 2.2
28.4	64.13 .64	47.2 1.6	38.69 .15	51.6 1.7	51.72 .06	29.2 0.5	10.77 .12	62.8 1.9
July 8.3	63.45 .70	48.5 1.1	38.53 .17	53.1 1.4	51.65 .09	28.7 0.5	10.63 .15	64.5 1.6
18.3	62.72 —.75	49.4 +0.5	38.34 —.20	54.3 +1.0	51.55 —.11	28.2 +0.5	10.46 —.18	65.9 +1.2
28.3	61.95 .78	49.6 0.0	38.14 .21	55.0 0.6	51.43 .13	27.6 0.5	10.27 .20	66.9 0.8
Aug. 7.3	61.17 .79	49.4 —0.5	37.91 .22	55.4 +0.1	51.29 .15	27.1 0.5	10.06 .22	67.5 +0.4
17.2	60.37 .78	48.6 1.0	37.68 .22	55.3 —0.3	51.13 .15	26.7 0.4	9.84 .22	67.7 0.0
27.2	59.60 .75	47.3 1.5	37.45 .23	54.7 0.8	50.98 .16	26.2 0.4	9.61 .23	67.4 —0.5
Sept. 6.2	58.87 —.71	45.6 —2.0	37.23 —.22	53.7 —1.2	50.82 —.15	25.9 +0.3	9.39 —.22	66.7 —0.9
16.1	58.19 .64	43.3 2.4	37.02 .20	52.3 1.6	50.67 .14	25.6 0.2	9.17 .20	65.6 1.3
26.1	57.58 .56	40.7 2.8	36.84 .16	50.5 2.0	50.55 .11	25.4 +0.1	8.98 .18	64.1 1.7
Oct. 6.1	57.07 .47	37.6 3.2	36.69 .13	48.4 2.4	50.45 .08	25.4 0.0	8.82 .14	62.2 2.1
16.1	56.66 .34	34.3 3.5	36.58 .08	45.8 2.7	50.39 —.04	25.5 —0.2	8.69 .10	59.9 2.5
26.0	56.39 —.21	30.7 —3.7	36.53 —.03	42.9 —3.0	50.36 .00	25.9 —0.4	8.62 —.05	57.2 —2.8
Nov. 5.0	56.25 —.06	27.0 3.8	36.53 +.03	39.8 3.2	50.39 +.05	26.4 0.6	8.59 .00	54.3 3.0
15.0	56.26 +.09	23.1 3.8	36.59 .09	36.6 3.3	50.47 .10	27.1 0.8	8.62 +.06	51.1 3.2
24.9	56.43 .24	19.3 3.7	36.70 .15	33.2 3.4	50.60 .15	28.1 1.1	8.71 .12	47.9 3.3
Dec. 4.9	56.75 .39	15.7 3.6	36.88 .21	29.8 3.4	50.77 .20	29.2 1.2	8.86 .18	44.6 3.2
14.9	57.21 +.53	12.2 —3.3	37.12 +.26	26.5 —3.2	50.99 +.24	30.6 —1.4	9.06 +.22	41.3 —3.2
24.9	57.80 .65	9.1 2.9	37.40 .30	23.3 3.0	51.24 .27	32.1 1.5	9.32 .27	38.2 3.0
34.8	58.51 +.77	6.5 —2.4	37.72 +.34	20.5 —2.7	51.53 +.30	33.6 —1.6	9.61 +.31	35.2 —2.7



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma^2$ Ursæ Minoris.		$\alpha$ Coronæ Borealis.		$\alpha$ Serpentis.		$\epsilon$ Serpentis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 15 20	+72° 14'	<sup>h</sup> <sup>m</sup> 15 29	+27° 5'	<sup>h</sup> <sup>m</sup> 15 38	+ 6° 47'	<sup>h</sup> <sup>m</sup> 15 45	+ 4° 49'
(Dec.30.9)	<sup>s</sup> 50.88 +.57	27.0 -3.0	<sup>s</sup> 48.08 +.37	67.0 -2.6	<sup>s</sup> 35.41 +.36	21.0 -2.1	<sup>s</sup> 4.21 +.36	33.5 -2.1
Jan. 9.8	51.49 .66	24.3 2.4	48.37 .30	64.4 2.4	35.68 .36	19.0 2.0	4.48 .36	31.5 1.9
19.8	52.19 .72	22.2 1.8	48.68 .31	62.1 2.1	35.97 .30	17.0 1.8	4.77 .30	29.6 1.8
29.8	52.94 .76	20.7 1.3	49.00 .32	60.2 1.7	36.27 .30	15.3 1.6	5.07 .30	27.9 1.6
Feb. 8.8	53.72 .78	19.8 -0.5	49.32 .32	58.8 1.2	36.58 .30	13.8 1.3	5.37 .30	26.4 1.3
18.7	54.49 +.76	19.6 +0.2	49.64 +.31	57.8 -0.7	36.88 +.29	12.7 -1.0	5.67 +.29	25.3 -1.0
28.7	55.24 .72	20.1 0.8	49.95 .30	57.4 -0.2	37.16 .36	11.9 0.6	5.95 .36	24.4 0.7
Mar. 10.7	55.94 .66	21.2 1.4	50.23 .27	57.5 +0.3	37.43 .36	11.4 -0.3	6.22 .36	24.0 -0.3
20.7	56.57 .58	23.0 2.0	50.49 .25	58.1 0.8	37.68 .34	11.3 +0.1	6.48 .34	23.8 0.0
30.6	57.10 .48	25.2 2.5	50.72 .22	59.1 1.2	37.90 .21	11.6 0.4	6.71 .22	24.0 +0.3
Apr. 9.6	57.53 +.37	27.9 +2.8	50.93 +.18	60.6 +1.6	38.10 +.19	12.2 +0.7	6.91 +.19	24.5 +0.6
19.6	57.84 .25	30.9 3.1	51.09 .15	62.4 1.9	38.28 .16	13.0 0.9	7.09 .16	25.3 0.9
29.5	58.03 .13	34.0 3.2	51.23 .12	64.4 2.1	38.42 .13	14.1 1.1	7.24 .14	26.2 1.0
May 9.5	58.10 +.01	37.3 3.2	51.33 .08	66.6 2.2	38.54 .10	15.3 1.2	7.36 .11	27.3 1.2
19.5	58.05 -1.1	40.5 3.1	51.39 .05	68.9 2.3	38.62 .07	16.6 1.3	7.46 .08	28.6 1.3
29.5	57.89 -2.2	43.6 +3.0	51.42 +.01	71.2 +2.2	38.68 +.04	18.0 +1.4	7.52 +.05	29.9 +1.3
June 8.4	57.61 .33	46.4 2.7	51.42 -0.2	73.4 2.1	38.71 +.01	19.4 1.3	7.55 +.02	31.2 1.3
18.4	57.24 .42	49.0 2.4	51.38 .05	75.5 2.0	38.70 -0.2	20.7 1.3	7.56 -0.1	32.4 1.2
28.4	56.77 .50	51.1 2.0	51.31 .08	77.3 1.8	38.67 .05	22.0 1.2	7.53 .04	33.6 1.1
July 8.4	56.23 .57	52.9 1.5	51.21 .11	79.0 1.5	38.60 .08	23.1 1.1	7.47 .07	34.7 1.0
18.3	55.63 -0.2	54.1 +1.0	51.08 -1.4	80.3 +1.2	38.51 -1.1	24.1 +0.9	7.38 -0.2	35.6 +0.9
28.3	54.98 .67	54.8 +0.5	50.93 .16	81.3 0.9	38.39 .13	24.9 0.8	7.27 .12	36.5 0.7
Aug. 7.3	54.30 .60	55.1 0.0	50.75 .18	82.0 0.5	38.25 .15	25.6 0.6	7.13 .13	37.1 0.6
17.2	53.60 .70	54.8 -0.6	50.57 .19	82.4 +0.2	38.10 .16	26.0 0.4	6.98 .16	37.6 0.4
27.2	52.90 .60	54.0 1.1	50.37 .19	82.4 -0.2	37.93 .17	26.3 +0.2	6.81 .17	37.9 +0.2
Sept. 6.2	52.22 -0.6	52.7 -1.6	50.18 -1.9	82.0 -0.6	37.76 -1.6	26.4 -0.1	6.64 -1.7	38.0 0.0
16.2	51.57 .62	50.9 2.1	49.99 .18	81.2 0.9	37.60 .16	26.2 0.3	6.48 .16	37.9 -0.2
26.1	50.98 .56	48.6 2.5	49.82 .16	80.1 1.3	37.45 .14	25.8 0.5	6.33 .14	37.6 0.4
Oct. 6.1	50.45 .48	45.9 2.9	49.68 .13	78.6 1.7	37.33 .11	25.2 0.7	6.20 .11	37.1 0.7
16.1	50.02 .38	42.8 3.2	49.57 .09	76.8 2.0	37.24 .07	24.3 1.0	6.11 .08	36.3 0.9
26.1	49.69 -2.7	39.4 -3.5	49.50 -0.4	74.6 -2.3	37.19 -0.3	23.2 -1.3	6.05 -0.4	35.3 -1.1
Nov. 5.0	49.48 .15	35.8 3.7	49.48 +.01	72.2 2.5	37.18 +.02	21.8 1.5	6.04 +.01	34.0 1.4
15.0	49.40 -0.1	32.1 3.8	49.51 .06	69.6 2.7	37.22 .06	20.2 1.7	6.07 .06	32.5 1.6
25.0	49.45 +.12	28.3 3.8	49.60 .11	66.7 2.9	37.31 .11	18.4 1.9	6.16 .11	30.9 1.8
Dec. 4.9	49.64 .26	24.5 3.7	49.74 .16	63.8 3.0	37.45 .16	16.4 2.0	6.29 .15	29.0 1.9
14.9	49.97 +.40	20.9 -3.5	49.93 +.21	60.8 -2.9	37.63 +.20	14.3 -2.1	6.47 +.20	27.0 -2.0
24.9	50.42 .51	17.5 3.2	50.16 .25	57.9 2.8	37.86 .24	12.1 2.1	6.69 .24	25.0 2.0
34.9	50.98 +.61	14.6 -2.7	50.43 +.29	55.1 -2.6	38.11 +.27	10.0 -2.1	6.94 +.27	22.9 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\zeta$ Ursæ Minoris.		$\epsilon$ Coronæ Borealis.		$\delta$ Scorpii.		$\beta^1$ Scorpii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 15 48	+78° 8'	<sup>h</sup> <sup>m</sup> 15 52	+27° 12'	<sup>h</sup> <sup>m</sup> 15 53	-22° 17'	<sup>h</sup> <sup>m</sup> 15 58	-19° 29'
(Dec.30.9)	<sup>s</sup> 4.51 +.69	45.4 -3.0	<sup>s</sup> 48.50 +.35	41.4 -2.8	<sup>s</sup> 31.34 +.38	25.1 -0.8	<sup>s</sup> 44.31 +.37	12.5 -0.9
Jan. 9.9	5.28 .84	42.6 2.6	48.77 .38	38.8 2.5	31.63 .30	25.9 0.9	44.59 .29	13.4 1.0
19.8	6.19 .96	40.3 2.1	49.07 .30	36.4 2.2	31.95 .38	26.9 1.0	44.90 .31	14.5 1.1
29.8	7.21 1.05	38.5 1.4	49.38 .38	34.4 1.8	32.27 .33	27.9 1.1	45.22 .38	15.6 1.1
Feb. 8.8	8.29 1.10	37.4 0.8	49.70 .38	32.8 1.3	32.60 .38	29.0 1.1	45.54 .38	16.7 1.1
18.7	9.41 1.11	36.9 -0.1	50.01 +.31	31.7 -0.8	32.93 +.38	30.2 -1.1	45.86 +.31	17.8 -1.0
28.7	10.52 1.08	37.1 +0.5	50.32 .30	31.2 -0.3	33.24 .31	31.2 1.0	46.17 .30	18.8 1.0
Mar. 10.7	11.57 1.01	38.0 1.2	50.62 .38	31.1 +0.2	33.54 .29	32.2 0.9	46.46 .29	19.7 0.9
20.7	12.54 .91	39.5 1.7	50.89 .36	31.6 0.7	33.82 .27	33.1 0.8	46.74 .27	20.5 0.7
30.6	13.39 .78	41.5 2.2	51.14 .33	32.6 1.2	34.08 .25	33.9 0.7	47.00 .25	21.2 0.6
Apr. 9.6	14.10 +.63	44.0 +2.6	51.36 +.30	34.0 +1.6	34.31 +.32	34.6 -0.6	47.23 +.32	21.7 -0.5
19.6	14.64 .46	46.8 3.0	51.54 .17	35.7 1.9	34.52 .20	35.2 0.5	47.44 .20	22.2 0.4
29.6	15.01 .37	49.9 3.2	51.70 .14	37.8 2.1	34.70 .17	35.7 0.4	47.62 .17	22.5 0.3
May 9.5	15.19 +.09	53.1 3.2	51.82 .11	40.0 2.3	34.85 .14	36.1 0.4	47.78 .14	22.7 0.2
19.5	15.20 -0.09	56.4 3.2	51.91 .07	42.3 2.3	34.97 .11	36.4 0.3	47.90 .11	22.8 0.1
29.5	15.02 -0.27	59.6 +3.1	51.97 +.04	44.7 +2.3	35.06 +.07	36.6 -0.2	48.00 +.06	22.9 -0.1
June 8.4	14.66 .44	62.5 2.9	51.98 .00	47.0 2.3	35.12 +.04	36.8 0.2	48.06 .04	22.9 0.0
18.4	14.15 .59	65.3 2.6	51.97 -0.04	49.2 2.1	35.14 .00	37.0 0.1	48.08 +.01	22.9 0.0
28.4	13.48 .73	67.7 2.2	51.91 .07	51.2 1.9	35.12 -0.03	37.1 -0.1	48.07 -0.03	22.8 +0.1
July 8.4	12.69 .84	69.6 1.8	51.83 .10	53.0 1.7	35.07 .06	37.1 0.0	48.03 .06	22.7 0.1
18.3	11.80 -0.24	71.2 +1.3	51.71 -0.13	54.5 +1.4	34.99 -0.10	37.0 +0.1	47.95 -0.09	22.6 +0.2
28.3	10.81 1.02	72.2 0.8	51.56 .16	55.7 1.0	34.88 .13	36.9 0.2	47.84 .12	22.4 0.2
Aug. 7.3	9.76 1.06	72.7 +0.3	51.39 .18	56.6 0.7	34.74 .15	36.7 0.2	47.70 .15	22.1 0.3
17.3	8.68 1.09	72.8 -0.2	51.20 .19	57.1 +0.3	34.58 .17	36.4 0.3	47.55 .16	21.8 0.3
27.2	7.58 1.10	72.3 0.7	51.00 .20	57.3 0.0	34.40 .18	36.0 0.4	47.38 .17	21.5 0.4
Sept. 6.2	6.48 1.07	71.3 -1.2	50.80 -0.20	57.1 -0.4	34.22 -0.18	35.6 +0.5	47.20 -0.18	21.1 +0.4
16.2	5.43 1.02	69.8 1.7	50.60 .19	56.5 0.8	34.05 .17	35.1 0.5	47.02 .17	20.7 0.4
26.1	4.44 .94	67.8 2.2	50.41 .17	55.5 1.1	33.89 .15	34.6 0.5	46.86 .15	20.2 0.4
Oct. 6.1	3.54 .84	65.4 2.6	50.25 .15	54.2 1.5	33.75 .12	34.0 0.5	46.73 .12	19.8 0.4
16.1	2.76 .71	62.6 3.0	50.12 .11	52.5 1.9	33.65 .08	33.5 0.4	46.62 .09	19.5 0.3
26.1	2.12 -0.55	59.4 -3.3	50.03 -0.07	50.5 -2.2	33.59 -0.04	33.1 +0.3	46.55 -0.04	19.2 +0.2
Nov. 5.0	1.64 .39	56.0 3.5	49.99 -0.02	48.1 2.5	33.57 +0.01	32.8 0.2	46.54 +0.01	19.1 +0.1
15.0	1.34 -0.20	52.3 3.7	49.99 +0.03	45.5 2.7	33.61 .07	32.7 +0.1	46.57 .06	19.1 -0.1
25.0	1.23 .00	48.6 3.7	50.05 .09	42.7 2.9	33.71 .19	32.7 -0.1	46.66 .11	19.2 0.3
Dec. 5.0	1.33 +0.20	44.9 3.7	50.16 .14	39.8 3.0	33.86 .17	32.9 0.3	46.80 .16	19.6 0.5
14.9	1.63 +0.40	41.2 -3.5	50.33 +0.19	36.8 -3.0	34.05 +.22	33.3 -0.5	46.99 +.21	20.2 -0.6
24.9	2.12 .58	37.8 3.3	50.54 .23	33.8 2.9	34.29 .26	33.9 0.7	47.22 .25	20.9 0.8
34.9	2.79 +0.75	34.7 -3.1	50.79 +.27	31.0 -2.7	34.57 +.29	34.7 -0.9	47.48 +.28	21.8 -1.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombridge 2320.		δ Ophiuchi.		τ Herculis.		α Scorpii. (Antares.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 16	<sup>m</sup> 5	<sup>h</sup> 16	<sup>m</sup> 8	<sup>h</sup> 16	<sup>m</sup> 16	<sup>h</sup> 16	<sup>m</sup> 22
		+68° 6'		— 3° 23'		+46° 35'		—26° 10'
(Dec. 30.9)	56.86 +.38	43.3 —3.2	18.31 +.95	43.3 —1.7	15.29 +.95	13.7 —3.2	20.54 +.97	20.7 —0.4
Jan. 9.9	57.29 .47	40.2 2.9	18.57 .97	44.9 1.6	15.57 .30	10.6 2.9	20.82 .30	21.2 0.6
19.8	57.81 .55	37.6 2.4	18.85 .99	46.5 1.5	15.90 .34	7.9 2.5	21.12 .32	21.8 0.7
29.8	58.39 .60	35.5 1.8	19.15 .30	48.0 1.4	16.25 .36	5.6 2.0	21.45 .33	22.5 0.8
Feb. 8.8	59.01 .63	34.0 1.2	19.45 .30	49.3 1.2	16.62 .36	3.9 1.5	21.78 .33	23.3 0.8
18.8	59.65 +.64	33.1 —0.5	19.75 +.29	50.5 —1.0	17.00 +.38	2.7 —0.8	22.11 +.33	24.2 —0.9
28.7	60.29 .63	33.0 +0.2	20.04 .99	51.4 0.8	17.38 .37	2.2 —0.2	22.44 .32	25.0 0.9
Mar. 10.7	60.91 .60	33.5 0.9	20.32 .97	52.0 0.5	17.75 .35	2.4 +0.4	22.76 .31	25.8 0.8
20.7	61.49 .55	34.7 1.5	20.58 .95	52.3 —0.2	18.09 .33	3.1 1.0	23.06 .99	26.6 0.8
30.7	62.01 .48	36.5 2.0	20.83 .93	52.4 0.0	18.41 .30	4.4 1.6	23.34 .97	27.4 0.7
Apr. 9.6	62.45 +.41	38.7 +2.5	21.05 +.31	52.3 +0.3	18.70 +.96	6.3 +2.1	23.61 +.95	28.0 —0.6
19.6	62.82 .32	41.4 2.9	21.25 .19	51.9 0.5	18.94 .92	8.5 2.4	23.85 .93	28.6 0.6
29.6	63.10 .32	44.4 3.1	21.43 .16	51.3 0.6	19.14 .18	11.2 2.7	24.06 .90	29.2 0.5
May 9.5	63.28 .13	47.6 3.2	21.57 .14	50.6 0.8	19.30 .13	14.0 2.9	24.25 .17	29.7 0.5
19.5	63.36 +.03	50.9 3.3	21.70 .11	49.8 0.8	19.40 .08	17.0 3.0	24.40 .14	30.2 0.4
29.5	63.35 —.06	54.2 +3.2	21.79 +.07	48.9 +0.9	19.46 +.03	20.0 +3.0	24.53 +.11	30.6 —0.4
June 8.5	63.24 .15	57.3 3.0	21.85 .04	48.0 0.9	19.47 —.02	23.0 2.9	24.61 .07	31.0 0.4
18.4	63.04 .94	60.2 2.8	21.87 +.01	47.1 0.9	19.43 .06	25.8 2.7	24.66 +.03	31.3 0.3
28.4	62.76 .32	62.9 2.5	21.87 —.02	46.2 0.8	19.34 .11	28.5 2.5	24.67 —.01	31.6 0.3
July 8.4	62.40 .40	65.2 2.1	21.83 .06	45.4 0.8	19.21 .15	30.8 2.2	24.64 .06	31.8 0.2
18.4	61.96 —.46	67.1 +1.7	21.75 —.09	44.6 +0.7	19.03 —.19	32.8 +1.8	24.58 —.08	32.0 —0.1
28.3	61.48 .51	68.5 1.2	21.65 .11	44.0 0.6	18.82 .92	34.3 1.4	24.48 .12	32.1 0.0
Aug. 7.3	60.94 .55	69.4 0.7	21.53 .14	43.4 0.5	18.58 .96	35.5 0.9	24.34 .15	32.1 +0.1
17.3	60.38 .58	69.8 +0.2	21.38 .16	43.0 0.4	18.31 .98	36.2 +0.6	24.18 .17	32.0 0.2
27.2	59.79 .59	69.7 —0.4	21.21 .17	42.6 0.3	18.02 .99	36.5 0.0	24.00 .19	31.7 0.3
Sept. 6.2	59.20 —.58	69.1 —0.9	21.04 —.17	42.4 +0.2	17.73 —.99	36.2 —0.5	23.81 —.19	31.4 +0.4
16.2	58.62 .56	68.0 1.4	20.88 .16	42.3 0.0	17.44 .96	35.5 1.0	23.62 .19	31.0 0.5
26.2	58.08 .52	66.3 1.9	20.72 .15	42.3 —0.1	17.16 .97	34.3 1.4	23.44 .17	30.5 0.5
Oct. 6.1	57.57 .47	64.2 2.3	20.58 .13	42.5 0.3	16.91 .94	32.6 1.9	23.28 .15	30.0 0.6
16.1	57.13 .40	61.6 2.8	20.47 .09	42.9 0.5	16.69 .90	30.5 2.3	23.15 .11	29.4 0.6
26.1	56.76 —.32	58.7 —3.1	20.39 —.04	43.4 —0.7	16.51 —.15	28.0 —2.7	23.06 —.07	28.8 +0.5
Nov. 5.1	56.49 .92	55.4 3.4	20.36 —.01	44.2 0.9	16.39 .09	25.2 3.0	23.02 —.02	28.3 0.5
15.0	56.32 .12	51.9 3.6	20.38 +.04	45.2 1.1	16.33 —.03	22.0 3.3	23.03 +.04	27.9 0.4
25.0	56.25 —.01	48.2 3.7	20.45 .09	46.4 1.2	16.33 +.03	18.7 3.4	23.10 .09	27.6 +0.2
Dec. 5.0	56.31 +.11	44.4 3.8	20.56 .14	47.6 1.4	16.40 .10	15.1 3.5	23.22 .15	27.5 0.0
14.9	56.47 +.22	40.6 —3.7	20.73 +.18	49.1 —1.5	16.54 +.17	11.6 —3.5	23.40 +.20	27.5 —0.1
24.9	56.75 .33	37.0 3.5	20.93 .92	50.7 1.6	16.73 .92	8.1 3.4	23.62 .94	27.8 0.3
34.9	57.13 +.43	33.7 —3.2	21.17 +.25	52.4 —1.7	16.98 +.28	4.8 —3.2	23.88 +.28	28.2 —0.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Draconis.		$\beta$ Herculis.		$\Lambda$ Draconis.		$\zeta$ Ophiuchi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 16 <sup>m</sup> 22	<sup>°</sup> +61 <sup>'</sup> 46	<sup>h</sup> 16 <sup>m</sup> 25	<sup>°</sup> +21 <sup>'</sup> 44	<sup>h</sup> 16 <sup>m</sup> 28	<sup>°</sup> +69 <sup>'</sup> 0	<sup>h</sup> 16 <sup>m</sup> 30	<sup>°</sup> -10 <sup>'</sup> 19
(Dec. 30 9)	<sup>s</sup> 23.40 +.30	<sup>"</sup> 26.3 -3.4	<sup>s</sup> 15.43 +.33	<sup>"</sup> 30.2 -2.7	<sup>s</sup> 8.99 +.35	<sup>"</sup> 58.0 -3.4	<sup>s</sup> 48.69 +.34	<sup>"</sup> 50.7 -1.2
Jan. 9.9	23.74 .37	23.1 3.0	15.68 .25	27.6 2.5	9.38 .45	54.7 3.0	48.94 .26	51.9 1.2
	19.9 24.14 .43	20.3 2.6	15.95 .28	25.3 2.2	9.88 .53	51.9 2.6	49.22 .28	53.1 1.2
	29.8 24.60 .48	18.0 2.0	16.23 .30	23.2 1.9	10.44 .59	49.6 2.0	49.51 .30	54.3 1.2
Feb. 8.8	25.10 .51	16.3 1.4	16.54 .30	21.5 1.5	11.06 .64	47.8 1.4	49.81 .30	55.5 1.1
	18.8 25.61 +.52	15.2 -0.8	16.81 +.30	20.2 -1.0	11.71 +.66	46.8 -0.8	50.11 +.30	56.5 -0.9
	28.7 26.13 .51	14.7 -0.1	17.14 .30	19.5 -0.5	12.38 .66	46.3 -0.1	50.41 .29	57.3 0.7
Mar. 10.7	26.64 .49	15.0 +0.6	17.44 .29	19.2 0.0	13.03 .64	46.6 +0.6	50.70 .28	57.9 0.5
	20.7 27.12 .46	15.9 1.2	17.71 .27	19.4 +0.4	13.65 .60	47.5 1.2	50.98 .27	58.4 0.3
	30.7 27.56 .41	17.4 1.8	17.98 .25	20.0 0.9	14.22 .54	49.0 1.8	51.24 .25	58.6 -0.1
Apr. 9.6	27.95 +.36	19.5 +2.3	18.21 +.29	21.1 +1.3	14.72 +.46	51.1 +2.3	51.49 +.23	58.7 0.0
	19.6 28.28 .30	22.0 2.7	18.42 .20	22.6 1.6	15.15 .38	53.6 2.7	51.71 .21	58.5 +0.2
	29.6 28.54 .23	24.8 3.0	18.61 .17	24.4 1.9	15.48 .29	56.5 3.0	51.91 .19	58.2 0.4
May 9.6	28.73 .15	26.9 3.2	18.76 .14	26.4 2.1	15.73 .19	59.6 3.2	52.08 .16	57.8 0.5
	19.5 28.85 .06	31.2 3.2	18.89 .10	28.5 2.2	15.86 +.09	62.9 3.3	52.23 .13	57.3 0.5
	29.5 28.89 +.01	34.4 +3.2	18.97 +.07	30.7 +2.2	15.90 -0.1	66.2 +3.3	52.35 +.10	56.8 +0.6
June 8.5	28.86 -0.7	37.6 3.1	19.03 +.04	32.9 2.2	15.84 .11	69.4 3.2	52.43 .07	56.2 0.6
	18.4 28.76 .14	40.7 2.9	19.04 .00	35.1 2.1	15.67 .21	72.5 3.0	52.48 +.03	55.6 0.6
	28.4 28.58 .21	43.5 2.6	19.02 -0.4	37.1 1.9	15.42 .30	75.3 2.7	52.50 .00	55.0 0.5
July 8.4	28.34 .27	46.0 2.3	18.97 .07	39.0 1.7	15.07 .28	77.9 2.3	52.48 -0.4	54.5 0.5
	18.4 28.04 -0.33	48.0 +1.2	18.88 -0.10	40.5 +1.5	14.65 -0.45	80.0 +1.9	52.42 -0.7	54.0 +0.5
	28.3 27.69 .27	49.7 1.5	18.76 .14	41.9 1.2	14.17 .52	81.7 1.5	52.33 .10	53.6 0.4
Aug. 7.3	27.30 .41	50.9 1.0	18.61 .16	42.9 0.9	13.62 .57	82.9 1.0	52.21 .13	53.2 0.4
	17.3 26.87 .44	51.6 +0.5	18.44 .18	43.7 0.6	13.03 .60	83.6 +0.5	52.07 .15	52.8 0.3
	27.3 26.42 .45	51.8 0.0	18.25 .19	44.1 +0.3	12.42 .62	83.9 0.0	51.91 .17	52.5 0.3
Sept. 6.2	25.96 -0.46	51.6 -0.6	18.05 -0.20	44.2 -0.1	11.79 -0.63	83.5 -0.6	51.73 -0.17	52.2 +0.2
	16.2 25.51 .45	50.7 1.1	17.85 .19	44.0 0.4	11.17 .61	82.7 1.1	51.56 .17	52.0 0.2
	26.2 25.07 .42	49.3 1.6	17.66 .18	43.3 0.7	10.57 .58	81.4 1.6	51.39 .16	51.9 +0.1
Oct. 6.1	24.67 .28	47.5 2.1	17.49 .16	42.4 1.1	10.00 .53	79.6 2.1	51.24 .14	51.9 0.0
	16.1 24.31 .33	45.2 2.5	17.34 .13	41.1 1.5	9.50 .47	77.2 2.5	51.11 .11	51.9 -0.1
	26.1 24.01 -0.27	42.5 -2.9	17.23 -0.09	39.5 -1.8	9.07 -0.29	74.5 -2.9	51.02 -0.07	52.1 -0.3
Nov. 5.1	23.78 .19	39.4 3.2	17.17 -0.04	37.6 2.1	8.72 .29	71.4 3.2	50.98 -0.02	52.5 0.4
	15.0 23.63 .11	36.0 3.5	17.15 .00	35.4 2.3	8.48 .19	68.0 3.5	50.97 +0.02	53.0 0.6
	25.0 23.57 -0.02	32.4 3.7	17.18 +0.06	33.0 2.5	8.35 -0.07	64.4 3.6	51.03 .06	53.7 0.8
Dec. 5.0	23.60 +0.08	28.7 3.7	17.26 .11	30.4 2.6	8.33 +0.05	60.7 3.7	51.13 .12	54.5 0.9
	15.0 23.72 +0.17	24.9 -3.6	17.39 +0.16	27.7 -2.7	8.44 +0.17	56.9 -3.7	51.27 +0.17	55.5 -1.1
	24.9 23.93 .25	21.3 3.5	17.57 .20	25.0 2.7	8.67 .28	53.3 3.6	51.47 .21	56.6 1.2
	34.9 24.23 +0.34	17.8 -3.3	17.79 +0.24	22.3 -2.6	9.00 +0.29	49.8 -3.3	51.69 +0.24	57.9 -1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Trianguli Australis.		$\eta$ Herculis.		$\kappa$ Ophiuchi.		$\delta$ Herculis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 16 36	—68° 48'	<sup>h</sup> <sup>m</sup> 16 38	+39° 8'	<sup>h</sup> <sup>m</sup> 16 52	+ 9° 33'	<sup>h</sup> <sup>m</sup> 16 57	+33° 43'
(Dec.30.9)	27.64 +.53	34.1 +1.8	55.63 +.32	30.5 —3.3	12.44 +.30	22.7 —2.1	20.18 +1.9	70.4 —3.1
Jan. 9.9	28.22 .61	32.4 1.5	55.87 .36	27.4 2.9	12.66 .23	20.6 2.0	20.40 .24	67.4 2.9
19.8	28.87 .68	31.1 1.1	56.15 .39	24.7 2.6	12.91 .26	18.6 1.9	20.65 .27	64.7 2.6
29.8	29.57 .72	30.3 0.6	56.46 .32	22.3 2.2	13.17 .27	16.8 1.7	20.93 .29	62.3 2.2
Feb. 8.8	30.31 .75	29.8 +0.3	56.79 .34	20.4 1.6	13.46 .29	15.3 1.4	21.24 .31	60.3 1.7
18.8	31.07 +.76	29.8 —0.2	57.13 +.34	19.0 —1.2	13.75 +.29	14.0 —1.0	21.56 +.32	58.8 —1.2
28.7	31.82 .75	30.2 0.6	57.48 .34	18.2 —0.5	14.04 .29	13.2 0.7	21.88 .32	57.9 0.6
Mar. 10.7	32.57 .73	31.0 0.9	57.81 .33	18.0 +0.1	14.32 .28	12.8 —0.3	22.20 .32	57.6 —0.1
20.7	33.29 .70	32.1 1.3	58.14 .31	18.5 0.7	14.60 .27	12.6 +0.1	22.51 .30	57.8 +0.5
30.7	33.97 .66	33.6 1.6	58.44 .29	19.5 1.3	14.86 .26	12.9 0.5	22.81 .28	58.5 1.0
Apr. 9.6	34.60 +.61	35.4 —1.9	58.72 +.26	21.0 +1.7	15.11 +.24	13.6 +0.8	23.09 +.26	59.8 +1.5
19.6	35.18 —.54	37.4 2.1	58.96 .23	22.9 2.1	15.34 .22	14.6 1.2	23.34 .24	61.6 1.9
29.6	35.69 .47	39.6 2.3	59.18 .19	25.3 2.5	15.54 .19	15.9 1.4	23.56 .21	63.7 2.3
May 9.5	36.13 .39	42.0 2.5	59.35 .16	27.9 2.7	15.72 .17	17.3 1.5	23.75 .17	66.1 2.5
19.5	36.48 .31	44.5 2.5	59.49 .11	30.7 2.8	15.87 .14	19.0 1.6	23.90 .14	68.7 2.7
29.5	36.74 +.21	47.1 —2.6	59.58 +.07	33.5 +2.9	16.00 +.10	20.6 +1.7	24.02 +.10	71.5 +2.7
June 8.5	36.91 .12	49.7 2.6	59.63 +.03	36.4 2.8	16.09 .07	22.4 1.7	24.10 .06	74.2 2.7
18.4	36.98 +.02	52.2 2.5	59.63 —.02	39.2 2.7	16.14 +.04	24.1 1.7	24.13 +.01	76.9 2.6
28.4	36.94 —.08	54.7 2.3	59.60 .06	41.8 2.5	16.16 .00	25.7 1.6	24.12 —.03	79.5 2.5
July 8.4	36.81 .18	56.9 2.1	59.51 .10	44.2 2.2	16.14 —.04	27.2 1.4	24.07 .07	81.9 2.2
18.4	36.58 —.27	58.9 —1.8	59.39 —.14	46.3 +1.9	16.09 —.07	28.5 +1.3	23.98 —.11	84.0 +2.0
28.3	36.27 .35	60.5 1.5	59.23 .18	48.0 1.6	16.00 .10	29.7 1.1	23.85 .15	85.8 1.6
Aug. 7.3	35.87 .42	61.8 1.1	59.03 .21	49.4 1.1	15.88 .13	30.6 0.9	23.68 .18	87.3 1.3
17.3	35.42 .48	62.7 0.7	58.81 .23	50.3 0.7	15.74 .16	31.4 0.8	23.49 .21	88.4 0.9
27.2	34.92 .51	63.1 —0.2	58.57 .25	50.9 +0.3	15.57 .17	31.9 0.4	23.27 .23	89.1 0.5
Sept. 6.2	34.39 —.53	63.1 +0.3	58.31 —.26	51.0 —0.1	15.39 —.18	32.2 +0.1	23.03 —.24	89.4 +0.1
16.2	33.86 .52	62.6 0.7	58.05 .25	50.6 0.6	15.20 .18	32.2 —0.1	22.80 .24	89.2 —0.4
26.2	33.35 .48	61.6 1.2	57.80 .24	49.8 1.1	15.02 .17	31.9 0.4	22.56 .23	88.6 0.8
Oct. 6.1	32.89 .43	60.2 1.6	57.57 .22	48.5 1.5	14.85 .16	31.4 0.6	22.34 .21	87.6 1.2
16.1	32.50 .35	58.3 2.0	57.37 .19	46.8 1.9	14.70 .13	30.7 0.9	22.14 .18	86.2 1.6
26.1	32.20 —.25	56.2 +2.3	57.20 —.14	44.6 —2.3	14.59 —.10	29.6 —1.2	21.98 —.14	84.4 —2.0
Nov. 5.1	32.01 .13	53.8 2.4	57.08 .10	42.1 2.7	14.51 .06	28.3 1.4	21.85 .10	82.2 2.4
15.0	31.93 —.01	51.3 2.5	57.01 —.04	39.3 2.9	14.48 —.01	26.8 1.6	21.78 —.05	79.7 2.7
25.0	31.98 +.11	48.7 2.5	57.00 +.02	36.2 3.2	14.49 +.04	25.0 1.8	21.75 +.01	76.9 2.9
Dec. 5.0	32.16 .24	46.2 2.5	57.04 .08	33.0 3.3	14.56 .09	23.1 2.0	21.79 .06	73.9 3.1
14.9	32.47 +.26	43.8 +2.3	57.15 +.13	29.6 —3.4	14.67 +.13	21.0 —2.1	21.88 +.11	70.7 —3.2
24.9	32.89 .47	41.7 2.0	57.31 .19	26.3 3.3	14.82 .18	18.9 2.2	22.02 .16	67.6 3.1
34.9	33.41 +.57	39.8 +1.7	57.53 +.24	23.1 —3.1	15.02 +.21	16.7 —2.1	22.20 +.20	64.5 —3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\epsilon$ Ursæ Minoris.		$\alpha^1$ Herculis.		$\delta$ Ophiuchi.		$\beta$ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 16 57	+82° 13'	<sup>h</sup> <sup>m</sup> 17 9	+14° 31'	<sup>h</sup> <sup>m</sup> 17 19	-24° 3'	<sup>h</sup> <sup>m</sup> 17 27	+52° 23'
(Dec.30.9)	36.51 +.53	29.4 -3.4	23.08 +.18	25.7 -2.3	19.74 +.21	55.2 -0.3	47.95 +.17	16.1 -3.5
Jan. 9.9	37.20 .83	26.1 3.1	23.29 .22	23.4 2.2	19.97 .24	55.5 0.3	48.15 .23	12.6 3.3
19.9	38.17 1.09	23.2 2.7	23.52 .25	21.3 2.1	20.23 .27	55.8 0.4	48.41 .28	9.4 3.0
29.8	39.37 1.30	20.8 2.2	23.78 .27	19.3 1.8	20.52 .29	56.2 0.4	48.72 .33	6.6 2.6
Feb. 8.8	40.78 1.47	18.8 1.7	24.05 .28	17.6 1.5	20.82 .31	56.7 0.4	49.07 .37	4.2 2.1
18.8	42.32 1.58	17.4 -1.0	24.34 +.29	16.3 -1.1	21.14 +.32	57.1 -0.4	49.45 +.39	2.4 -1.5
28.8	43.94 1.63	16.7 -0.4	24.63 .29	15.4 0.7	21.45 .32	57.6 0.4	49.85 .40	1.2 0.9
Mar. 10.7	45.59 1.63	16.7 +0.3	24.92 .29	14.9 -0.3	21.77 .32	57.9 0.3	50.26 .41	0.6 -0.2
20.7	47.20 1.56	17.3 0.9	25.20 .28	14.9 +0.2	22.08 .31	58.3 0.3	50.66 .40	0.7 +0.4
30.7	48.71 1.44	18.5 1.5	25.47 .27	15.3 0.6	22.39 .30	58.5 0.2	51.06 .38	1.4 1.0
Apr. 9.6	50.07 1.26	20.2 +2.0	25.73 +.25	16.0 +0.9	22.68 +.26	58.7 -0.2	51.43 +.36	2.8 +1.6
19.6	51.24 1.06	22.5 2.5	25.97 .23	17.2 1.3	22.96 .27	58.9 0.1	51.77 .32	4.7 2.1
29.6	52.18 .81	25.2 2.8	26.19 .21	18.7 1.6	23.21 .25	59.0 0.1	52.07 .28	7.0 2.5
May 9.6	52.87 .55	28.1 3.0	26.39 .18	20.4 1.8	23.45 .22	59.1 0.1	52.34 .24	9.7 2.9
19.5	53.28 +.27	31.3 3.2	26.55 .15	22.3 1.9	23.66 .19	59.2 0.1	52.54 .18	12.7 3.1
29.5	53.41 -.01	34.5 +3.2	26.69 +.12	24.2 +2.0	23.83 +.16	59.2 -0.1	52.70 +.13	15.9 +3.2
June 8.5	53.26 .28	37.7 3.2	26.79 .08	26.2 2.0	23.98 .12	59.3 0.1	52.80 .07	19.2 3.2
18.5	52.84 .56	40.8 3.0	26.86 .05	28.2 1.9	24.08 .08	59.5 0.1	52.84 +.01	22.4 3.1
28.4	52.15 .81	43.8 2.8	26.89 +.01	30.1 1.8	24.15 +.04	59.6 0.1	52.81 -.05	25.6 3.0
July 8.4	51.22 1.04	46.4 2.5	26.88 -.03	31.8 1.7	24.17 .00	59.7 0.2	52.73 .11	28.5 2.8
18.4	50.06 1.24	48.8 +2.1	26.83 -.07	33.4 +1.5	24.15 -.04	59.9 -0.2	52.60 -.17	31.2 +2.5
28.3	48.72 1.42	50.7 1.7	26.75 .10	34.8 1.3	24.09 .06	60.1 0.1	52.40 .22	33.6 2.2
Aug. 7.3	47.22 1.57	52.2 1.3	26.63 .13	36.0 1.0	23.99 .12	60.2 0.1	52.16 .26	35.6 1.8
17.3	45.59 1.67	53.2 0.8	26.49 .16	36.9 0.8	23.85 .15	60.3 -0.1	51.88 .30	37.1 1.3
27.3	43.87 1.75	53.7 +0.3	26.32 .18	37.5 0.5	23.69 .17	60.3 0.0	51.56 .33	38.2 0.9
Sept. 6.2	42.10 1.78	53.8 -0.2	26.13 -.19	37.9 +0.2	23.51 -.19	60.2 +0.1	51.22 -.35	38.8 +0.4
16.2	40.31 1.77	53.3 0.7	25.94 .19	38.0 -0.1	23.31 .19	60.0 0.1	50.87 .36	39.0 -0.1
26.2	38.56 1.72	52.3 1.2	25.75 .19	37.7 0.4	23.12 .18	59.7 0.2	50.51 .35	38.6 0.6
Oct. 6.2	36.87 1.63	50.9 1.7	25.56 .17	37.2 0.7	22.93 .17	59.5 0.3	50.16 .33	37.7 1.1
16.1	35.30 1.49	48.9 2.1	25.40 .15	36.4 1.0	22.77 .15	59.2 0.3	49.84 .30	36.3 1.6
26.1	33.89 1.32	46.6 -2.6	25.27 -.11	35.2 -1.3	22.64 -.11	58.8 +0.3	49.55 -.27	34.4 -2.1
Nov. 5.1	32.67 1.10	43.8 2.9	25.17 .07	33.8 1.6	22.55 .07	58.6 0.3	49.31 .22	32.1 2.5
15.0	31.69 .85	40.7 3.2	25.12 -.03	32.1 1.8	22.51 -.02	58.4 0.2	49.12 .16	29.3 2.2
25.0	30.98 .57	37.4 3.4	25.12 +.02	30.1 2.0	22.51 +.03	58.2 0.1	49.00 .09	26.2 3.2
Dec. 5.0	30.55 -.27	33.9 3.6	25.16 .07	28.0 2.2	22.57 .08	58.3 +0.1	48.95 -.02	22.9 3.4
15.0	30.44 +.04	30.3 -3.6	25.25 +.11	25.7 -2.3	22.68 +.14	58.4 -0.1	48.96 +.06	19.4 -3.6
24.9	30.63 .35	26.7 3.5	25.39 .16	23.3 2.4	22.85 .18	58.4 0.2	49.05 .12	15.8 3.6
34.9	31.14 +.66	23.3 -3.4	25.57 +.20	21.0 -2.4	23.05 +.22	58.6 -0.3	49.21 +.19	12.2 -3.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ophiuchi.		$\omega$ Draconis.		$\mu$ Herculis.		$\psi^1$ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 17 29	<sup>m</sup> +12 38'	<sup>h</sup> 17 37	<sup>m</sup> +68 48'	<sup>h</sup> 17 41	<sup>m</sup> +27 47'	<sup>h</sup> 17 43	<sup>m</sup> +72 12'
(Dec. 30.9)	<sup>s</sup> 34.62 +.17	<sup>"</sup> 47.0 -2.2	<sup>s</sup> 33.76 +.16	<sup>"</sup> 43.4 -3.6	<sup>s</sup> 56.15 +.15	<sup>"</sup> 24.6 -2.8	<sup>s</sup> 54.53 +.16	<sup>"</sup> 22.1 -3.6
Jan. 9.9	34.81 .30	44.8 2.1	33.98 .36	39.9 3.4	56.32 .19	21.8 2.8	54.76 .39	18.6 3.4
19.9	35.02 .33	42.7 2.0	34.31 .38	36.6 3.1	56.52 .23	19.1 2.6	55.12 .43	15.3 3.3
29.9	35.27 .26	40.8 1.8	34.74 .47	33.7 2.7	56.76 .25	16.6 2.3	55.59 .53	12.3 2.8
Feb. 8.8	35.53 .27	39.2 1.5	35.26 .54	31.2 2.2	57.03 .27	14.5 1.9	56.17 .62	9.8 2.3
18.8	35.81 +.26	37.8 -1.1	35.83 +.60	29.3 -1.6	57.31 +.29	12.9 -1.4	56.82 +.68	7.8 -1.7
28.8	36.09 .29	36.9 0.7	36.45 .63	28.0 1.0	57.61 .30	11.7 0.9	57.54 .73	6.4 1.1
Mar. 10.7	36.38 .29	36.4 -0.3	37.09 .64	27.4 -0.3	57.91 .30	11.0 -0.4	58.28 .75	5.7 -0.4
20.7	36.66 .26	36.3 +0.1	37.74 .64	27.4 +0.3	58.22 .30	10.9 +0.1	59.04 .75	5.6 +0.3
30.7	36.94 .27	36.6 0.5	38.37 .61	28.1 1.0	58.51 .29	11.3 0.7	59.78 .79	6.2 0.9
Apr. 9.7	37.21 +.26	37.3 +0.9	38.96 +.57	29.4 +1.6	58.80 +.26	12.2 +1.1	60.48 +.67	7.4 +1.5
19.6	37.46 .24	38.3 1.2	39.50 .51	31.3 2.1	59.07 .26	13.6 1.6	61.12 .60	9.3 2.1
29.6	37.69 .23	39.7 1.5	39.98 .44	33.7 2.6	59.32 .24	15.4 1.9	61.68 .51	11.6 2.5
May 9.6	37.90 .20	41.3 1.7	40.38 .35	36.5 2.9	59.54 .21	17.5 2.2	62.14 .41	14.3 2.9
19.6	38.09 .17	43.1 1.9	40.68 .26	39.6 3.2	59.74 .18	19.8 2.4	62.51 .30	17.3 3.1
29.5	38.24 +.14	45.0 +1.9	40.89 +.16	42.9 +3.3	59.90 +.14	22.4 +2.6	62.75 +.19	20.6 +3.3
June 8.5	38.36 .11	47.0 2.0	41.00 +.06	46.3 3.4	60.03 .11	25.0 2.6	62.88 +.07	23.9 3.4
18.5	38.45 .07	48.9 1.9	41.00 -.05	49.7 3.3	60.11 .06	27.6 2.6	62.89 -.06	27.3 3.3
28.4	38.50 +.03	50.8 1.8	40.91 .15	52.9 3.2	60.16 +.02	30.1 2.5	62.77 .17	30.6 3.2
July 8.4	38.51 -.01	52.6 1.7	40.71 .24	56.0 3.0	60.16 -.02	32.5 2.3	62.53 .29	33.7 2.0
18.4	38.48 -.05	54.2 +1.5	40.42 -.33	58.9 +2.7	60.12 -.06	34.7 +2.1	62.18 -.40	36.5 +2.7
28.4	38.42 .09	55.6 1.3	40.04 .42	61.4 2.3	60.03 .10	36.7 1.8	61.73 .50	39.1 2.4
Aug. 7.3	38.31 .12	56.8 1.1	39.58 .49	63.5 1.9	59.91 .14	38.4 1.5	61.19 .58	41.3 2.0
17.3	38.18 .15	57.7 0.8	39.06 .55	65.2 1.5	59.75 .17	39.8 1.2	60.56 .66	43.1 1.5
27.3	38.02 .17	58.4 0.6	38.48 .60	66.5 1.0	59.57 .20	40.7 0.8	59.87 .71	44.4 1.1
Sept. 6.3	37.84 -.19	58.9 +0.3	37.87 -.63	67.2 +0.5	59.36 -.21	41.4 +0.5	59.14 -.75	45.2 +0.6
16.2	37.65 .19	59.0 0.0	37.23 .64	67.5 0.0	59.14 .22	41.6 +0.1	58.37 .77	45.5 0.0
26.2	37.45 .19	58.9 -0.3	36.58 .64	67.2 -0.6	58.91 .22	41.5 -0.3	57.60 .77	45.3 -0.5
Oct. 6.2	37.27 .18	58.5 0.6	35.95 .69	66.4 1.1	58.69 .21	41.0 0.7	56.83 .75	44.5 1.0
16.1	37.10 .16	57.8 0.9	35.35 .58	65.0 1.6	58.49 .19	40.0 1.1	56.10 .70	43.3 1.5
26.1	36.96 -.13	56.8 -1.1	34.80 -.52	63.2 -2.1	58.31 -.16	38.7 -1.5	55.43 -.64	41.5 -2.0
Nov. 5.1	36.85 .09	55.5 1.4	34.31 .44	60.8 2.5	58.16 .12	37.0 1.9	54.83 .55	39.3 2.5
15.1	36.78 -.04	54.0 1.7	33.91 .36	58.1 2.9	58.06 .08	34.9 2.2	54.32 .45	36.6 2.9
25.0	36.76 .00	52.2 1.9	33.61 .25	55.0 3.3	58.00 -.03	32.6 2.5	53.92 .33	33.5 3.2
Dec. 5.0	36.79 +.05	50.2 2.1	33.41 .14	51.6 3.5	58.00 +.02	30.0 2.7	53.65 .20	30.2 3.5
15.0	36.86 +.10	48.1 -2.2	33.32 -.02	48.0 -3.6	58.04 +.07	27.1 -2.9	53.51 -.07	26.6 -3.6
25.0	36.98 .14	45.8 2.2	33.36 +.10	44.3 3.7	58.13 .12	24.2 2.9	53.51 +.07	22.9 3.7
34.9	37.14 +.18	43.6 -2.3	33.52 +.21	40.7 -3.6	58.27 +.17	21.3 -2.9	53.65 +.21	19.3 -3.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Draconis.		$\gamma^s$ Sagittarii.		$\mu$ Sagittarii.		$\eta$ Serpentis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 17 <sup>m</sup> 53	+51° 29'	<sup>h</sup> 17 <sup>m</sup> 58	-30° 25'	<sup>h</sup> 18 <sup>m</sup> 6	-21° 5'	<sup>h</sup> 18 <sup>m</sup> 15	-2° 55'
Jan. 0.0	<sup>s</sup> 54.08 +.13	75.4 -3.5	<sup>s</sup> 23.94 +.18	17.2 +0.4	<sup>s</sup> 51.95 +.16	6.6 -0.2	<sup>s</sup> 20.42 +.13	30.6 -1.3
9.9	54.24 .19	72.0 3.4	24.14 .22	16.9 0.3	52.13 .20	6.8 0.2	20.57 .17	31.9 1.3
19.9	54.46 .25	68.7 3.1	24.38 .25	16.6 0.2	52.35 .23	7.0 0.3	20.75 .20	33.2 1.2
29.9	54.73 .29	65.7 2.8	24.65 .28	16.5 0.1	52.59 .25	7.3 0.3	20.96 .23	34.4 1.1
Feb. 8.9	55.05 .33	63.2 2.3	24.94 .30	16.4 +0.1	52.86 .28	7.5 0.2	21.20 .25	35.4 0.9
18.8	55.40 +.37	61.1 -1.8	25.26 +.32	16.3 0.0	53.14 +.29	7.7 -0.2	21.46 +.28	36.2 -0.7
28.8	55.78 .39	59.6 1.3	25.58 .33	16.3 0.0	53.44 .30	7.9 -0.1	21.73 .27	36.9 0.5
Mar. 10.8	56.18 .40	58.8 -0.5	25.91 .33	16.3 0.0	53.74 .31	7.9 0.0	22.01 .28	37.2 -0.2
20.8	56.58 .40	58.6 +0.1	26.24 .33	16.3 0.0	54.05 .31	7.9 +0.1	22.29 .28	37.3 +0.1
30.7	56.97 .39	59.1 0.8	26.57 .33	16.3 0.0	54.36 .30	7.8 0.2	22.57 .28	37.1 0.3
Apr. 9.7	57.35 +.37	60.1 +1.4	26.90 +.32	16.3 0.0	54.66 +.30	7.6 +0.2	22.85 +.28	36.7 +0.6
19.7	57.71 .34	61.8 1.9	27.21 .31	16.4 -0.1	54.95 .29	7.4 0.3	23.12 .27	36.0 0.8
29.6	58.04 .31	63.9 2.4	27.51 .29	16.5 0.1	55.23 .27	7.1 0.3	23.38 .25	35.1 1.0
May 9.6	58.32 .28	66.5 2.7	27.79 .27	16.6 0.1	55.50 .25	6.7 0.3	23.63 .24	34.0 1.1
19.6	58.57 .22	69.4 3.0	28.04 .24	16.8 0.2	55.74 .23	6.4 0.3	23.85 .21	32.9 1.2
29.6	58.76 +.16	72.5 +3.2	28.27 +.21	17.0 -0.3	55.95 +.20	6.1 +0.3	24.05 +.19	31.6 +1.3
June 8.5	58.89 .11	75.8 3.3	28.45 .17	17.3 0.3	56.14 .17	5.8 0.3	24.23 .16	30.3 1.3
18.5	58.97 +.05	79.1 3.3	28.61 .13	17.7 0.4	56.29 .13	5.6 0.2	24.36 .12	29.1 1.2
28.5	58.99 -0.1	82.3 2.2	28.72 .09	18.1 0.5	56.40 .09	5.5 +0.1	24.47 .08	27.9 1.2
July 8.4	58.95 .07	85.4 3.0	28.78 +.04	18.6 0.5	56.46 +.04	5.4 0.0	24.53 +.04	26.8 1.1
18.4	58.85 -1.3	88.3 +2.7	28.80 -0.1	19.1 -0.5	56.49 .00	5.4 0.0	24.55 .00	25.8 +0.9
28.4	58.69 .18	90.8 2.4	28.76 .06	19.6 0.5	56.46 -0.04	5.5 -0.1	24.53 -0.04	24.9 0.8
Aug. 7.4	58.48 .23	93.1 2.0	28.68 .10	20.1 0.5	56.40 .08	5.6 0.1	24.47 .08	24.2 0.7
17.3	58.22 .28	94.9 1.6	28.56 .14	20.6 0.4	56.30 .12	5.7 0.1	24.37 .11	23.6 0.5
27.3	57.92 .31	96.4 1.2	28.41 .17	20.9 0.3	56.16 .15	5.8 0.1	24.24 .14	23.2 0.4
Sept. 6.3	57.60 -0.33	97.3 +0.7	28.23 -0.19	21.2 -0.2	55.99 -0.17	5.9 -0.1	24.08 -0.17	22.9 +0.2
16.3	57.26 .35	97.8 +0.2	28.02 .20	21.4 -0.1	55.81 .19	5.9 -0.1	23.91 .18	22.7 +0.1
26.2	56.91 .35	97.7 -0.2	27.81 .21	21.4 +0.1	55.61 .19	6.0 0.0	23.73 .18	22.7 -0.1
Oct. 6.2	56.56 .34	97.2 0.8	27.61 .20	21.3 0.2	55.42 .18	6.0 0.0	23.54 .18	22.9 0.2
16.2	56.23 .32	96.1 1.3	27.42 .18	21.0 0.3	55.24 .17	5.9 +0.1	23.37 .16	23.2 0.4
26.1	55.93 -0.28	94.6 -1.8	27.25 -0.15	20.6 +0.4	55.09 -0.14	5.9 +0.1	23.21 -0.14	23.6 -0.5
Nov. 5.1	55.67 .24	92.5 2.2	27.12 .11	20.2 0.5	54.97 .10	5.8 +0.1	23.09 .11	24.2 0.7
15.1	55.46 .18	90.1 2.7	27.04 .06	19.7 0.5	54.88 .06	5.8 0.0	23.00 .07	25.0 0.8
25.1	55.30 .12	87.2 3.0	27.01 -0.01	19.2 0.5	54.85 -0.02	5.7 0.0	22.95 -0.03	25.9 1.0
Dec. 5.0	55.22 -0.06	84.0 3.3	27.03 +0.05	18.6 0.5	54.80 +0.04	5.7 -0.1	22.95 +0.02	26.9 1.1
15.0	55.20 +0.01	80.6 -3.5	27.11 +0.10	18.2 +0.4	54.92 +0.03	5.8 -0.1	22.99 +0.06	28.1 -1.2
25.0	55.25 .08	77.1 3.5	27.23 .15	17.7 0.4	55.03 .13	6.0 0.2	23.07 .11	29.3 1.3
35.0	55.36 +.15	73.6 -3.6	27.41 +0.20	17.4 +0.3	55.18 +.17	6.1 -0.2	23.20 +.15	30.6 -1.3



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	1 Aquilæ.		σ Octantis.		α Lyrae. (Vega.)		β Lyrae.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 18 <sup>m</sup> 28	— <sup>°</sup> 8 <sup>'</sup> 19	<sup>h</sup> 18	— <sup>°</sup> 89 <sup>'</sup> 15	<sup>h</sup> 18 <sup>m</sup> 33	+ <sup>°</sup> 38 <sup>'</sup> 40	<sup>h</sup> 18 <sup>m</sup> 45	+ <sup>°</sup> 33 <sup>'</sup> 13
Jan. 0.0	55.78 +.13	16.4 —1.0	31 43.2+ 4.3	67.4 +3.4	1.18 +.09	45.9 —3.2	48.67 +.07	55.6 —3.0
10.0	55.93 .16	17.3 0.9	31 49.4 7.9	64.0 3.2	1.29 .13	42.7 3.1	48.77 .12	52.6 2.9
19.9	56.11 .19	18.2 0.9	31 58.8 10.6	60.9 3.0	1.44 .18	39.7 3.0	48.91 .16	49.8 2.8
29.9	56.31 .22	19.1 0.8	32 10.8 13.3	58.0 2.7	1.64 .22	36.9 2.7	49.09 .20	47.1 2.6
Feb. 8.0	56.55 .24	19.8 0.7	32 25.2 15.4	55.5 2.3	1.88 .26	34.3 2.3	49.31 .23	44.6 2.2
18.8	56.80 +.26	20.4 —0.5	32 41.6+17.2	53.4 +1.9	2.15 +.28	32.2 —1.9	49.56 +.26	42.6 —1.8
28.8	57.07 .27	20.8 0.3	32 59.4 18.5	51.7 1.5	2.45 .30	30.6 1.4	49.83 .28	41.0 1.4
Mar. 10.8	57.35 .28	21.0 —0.1	33 18.4 19.3	50.4 1.0	2.76 .32	29.5 0.8	50.13 .30	39.9 0.8
20.8	57.63 .29	21.0 +0.1	33 37.9 19.7	49.7 +0.5	3.09 .33	29.0 —0.2	50.43 .31	39.3 —0.3
30.7	57.92 .29	20.8 0.4	33 57.7 19.7	49.4 0.0	3.42 .33	29.1 +0.4	50.75 .31	39.4 +0.3
Apr. 9.7	58.20 +.29	20.3 +0.5	34 17.3+19.3	49 6 —0.5	3.75 +.33	29.8 +1.0	51.06 +.31	39.9 +0.9
19.7	58.49 .28	19.7 0.7	34 36.3 18.5	50.3 0.9	4.07 .31	31.0 1.5	51.37 .30	41.1 1.4
29.7	58.76 .27	18.9 0.9	34 54.3 17.3	51.5 1.4	4.38 .29	32.7 2.0	51.67 .29	42.7 1.8
May 9.6	59.02 .25	18.0 1.0	35 10.8 15.8	53.1 1.8	4.66 .27	34.9 2.3	51.95 .27	44.7 2.2
19.6	59.26 .23	17.0 1.0	35 25.7 14.0	55.1 2.2	4.92 .24	37.5 2.7	52.20 .24	47.1 2.5
29.6	59.48 +.20	15.9 +1.0	35 38.7+11.8	57.4 —2.5	5.14 +.20	40.3 +2.9	52.43 +.21	49.7 +2.7
June 8.5	59.66 .17	14.9 1.0	35 49.2 9.3	60.0 2.7	5.31 .16	43.3 3.0	52.62 .17	52.5 2.9
18.5	59.82 .14	13.9 1.0	35 57.2 6.6	62.9 2.9	5.45 .11	46.3 3.1	52.77 .13	55.4 2.9
28.5	59.94 .10	13.0 0.9	36 2.3 3.7	65.8 3.0	5.54 .06	49.4 3.0	52.88 .08	58.3 2.9
July 8.5	60.02 .06	12.1 0.8	36 4.4+ 0.7	68.9 3.1	5.58 +.02	52.4 2.9	52.94 +.04	61.2 2.8
18.4	60.06 +.02	11.3 +0.7	36 3.5— 2.4	71.9 —3.0	5.57 —.04	55.2 +2.7	52.95 —.01	63.9 +2.6
28.4	60.05 —.02	10.7 0.6	35 59.6 5.4	74.9 2.9	5.50 .09	57.9 2.5	52.91 .06	66.5 2.4
Aug. 7.4	60.00 .07	10.2 0.5	35 52.9 2.2	77.6 2.6	5.39 .13	60.2 2.2	52.83 .11	68.8 2.1
17.4	59.92 .10	9.8 0.3	35 43.3 10.8	80.1 2.3	5.24 .17	62.3 1.9	52.70 .15	70.8 1.8
27.3	59.79 .14	9.6 0.2	35 31.4 13.0	82.1 1.9	5.05 .21	63.9 1.5	52.54 .18	72.4 1.5
Sept. 6.3	59.64 —.16	9.4 +0.1	35 17.5—14.8	83.8 —1.4	4.82 —.24	65.2 +1.1	52.34 —.21	73.7 +1.1
16.3	59.47 .18	9.3 0.0	35 2.1 16.0	85.0 0.8	4.57 .25	66.1 0.6	52.12 .23	74.6 0.7
26.2	59.29 .18	9.4 —0.1	34 45.7 16.7	85.5 —0.2	4.31 .26	66.4 +0.2	51.88 .24	75.1 +0.3
Oct. 6.2	59.11 .18	9.5 0.2	34 28.9 16.7	85.4 +0.4	4.04 .28	66.4 —0.3	51.64 .24	75.1 —0.2
16.2	58.93 .17	9.7 0.3	34 12.6 16.0	84.7 1.0	3.79 .25	65.9 0.8	51.40 .23	74.7 0.6
26.2	58.78 —.14	10.0 —0.4	33 57.1—14.7	83.5 +1.5	3.55 —.23	64.9 —1.3	51.18 —.21	73.9 —1.1
Nov. 5.1	58.65 .11	10.4 0.5	33 43.4 12.8	81.7 2.0	3.33 .19	63.4 1.7	50.98 .18	72.6 1.5
15.1	58.55 .08	10.9 0.6	33 31.8 10.3	79.4 2.5	3.16 .16	61.5 2.1	50.82 .15	70.9 1.9
25.1	58.50 —.03	11.6 0.7	33 22.9 7.5	76.7 2.9	3.02 .11	59.2 2.5	50.69 .10	68.8 2.2
Dec. 5.1	58.48 +.01	12.3 0.8	33 17.0 4.3	73.6 3.2	2.94 .06	56.6 2.8	50.61 .06	66.4 2.5
15.0	58.52 +.06	13.1 —0.9	33 14.4— 0.9	70.4 +3.3	2.91 —.01	53.7 —3.0	50.57 —.01	63.8 —2.8
25.0	58.59 .10	14.0 0.9	33 15.2+ 2.5	67.0 3.4	2.93 +.05	50.7 3.1	50.59 +.04	60.9 2.9
35.0	58.71 +.13	14.9 —0.9	33 19.4+ 5.8	63.7 +3.5	3.01 +.10	47.5 —3.2	50.66 +.09	57.9 —3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\sigma$ Sagittarii.		50 Draconis.		$\zeta$ Aquilæ.		$\delta$ Sagittarii.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 18 48	<sup>m</sup> —26° 26'	<sup>h</sup> 18 49	<sup>m</sup> +75° 17'	<sup>h</sup> 19 0	<sup>m</sup> +13° 41'	<sup>h</sup> 19 10	<sup>m</sup> —19° 9'
Jan. 0.0	6.73 +.12	10.2 +0.3	59.65 —.10	62.4 —3.6	6.32 +.08	44.5 —2.0	53.11 +.09	16.2 —0.1
10.0	6.87 .16	9.9 0.3	59.65 +.07	58.9 3.5	6.41 .12	42.4 2.0	53.22 .13	16.3 0.1
20.0	7.05 .20	9.7 0.3	59.82 .25	55.4 3.4	6.54 .15	40.4 2.0	53.37 .16	16.3 —0.1
29.9	7.26 .23	9.4 0.3	60.15 .40	52.1 3.2	6.71 .19	38.5 1.8	53.55 .20	16.4 0.0
Feb. 8.9	7.51 .26	9.1 0.3	60.62 .54	49.0 2.8	6.91 .21	36.8 1.6	53.76 .22	16.4 0.0
18.9	7.78 +.28	8.8 +0.3	61.23 +.06	46.4 —2.4	7.13 +.23	35.4 —1.3	54.00 +.25	16.3 +0.2
28.8	8.07 .29	8.5 0.3	61.95 .76	44.3 1.9	7.37 .25	34.3 0.9	54.25 .27	16.1 0.2
Mar. 10.8	8.37 .31	8.2 0.4	62.76 .83	42.7 1.2	7.63 .27	33.6 0.5	54.53 .28	15.8 0.4
20.8	8.68 .31	7.8 0.4	63.62 .88	41.8 —0.6	7.91 .28	33.3 —0.1	54.81 .29	15.4 0.5
30.8	9.00 .32	7.4 0.4	64.51 .89	41.5 +0.1	8.20 .28	33.4 +0.3	55.11 .30	14.9 0.6
Apr. 9.7	9.32 +.32	6.9 +0.5	65.39 +.87	41.9 +0.7	8.47 +.28	34.0 +0.7	55.41 +.30	14.3 +0.7
19.7	9.63 .31	6.5 0.4	66.25 .83	43.0 1.3	8.76 .28	34.9 1.1	55.72 .30	13.6 0.7
29.7	9.94 .30	6.0 0.4	67.05 .76	44.6 1.9	9.03 .28	36.2 1.4	56.02 .30	12.8 0.8
May 9.7	10.24 .29	5.7 0.4	67.76 .66	46.7 2.4	9.30 .26	37.8 1.8	56.31 .29	12.0 0.8
19.6	10.53 .27	5.3 0.3	68.38 .55	49.3 2.8	9.55 .24	39.7 1.9	56.59 .27	11.3 0.8
29.6	10.78 +.24	5.0 +0.2	68.87 +.43	52.2 +2.1	9.79 +.22	41.7 +2.1	56.85 +.25	10.5 +0.7
June 8.6	11.01 .21	4.9 +0.1	69.23 .29	55.4 3.3	9.98 .18	43.8 2.2	57.09 .22	9.8 0.6
18.5	11.21 .18	4.8 0.0	69.45 +.15	58.8 3.4	10.15 .15	46.0 2.2	57.29 .19	9.3 0.5
28.5	11.36 .13	4.8 —0.1	69.52 .00	62.2 3.4	10.28 .11	48.1 2.2	57.46 .15	8.8 0.4
July 8.5	11.47 .09	5.0 0.2	69.45 —.15	65.6 3.4	10.38 .08	50.3 2.1	57.59 .10	8.5 0.3
18.5	11.54 +.04	5.2 —0.3	69.22 —.29	68.9 +3.2	10.42 +.04	52.3 +1.9	57.67 +.06	8.2 +0.2
28.4	11.55 —.01	5.6 0.4	68.86 .43	72.1 3.0	10.43 —.02	54.1 1.7	57.71 +.01	8.1 0.0
Aug. 7.4	11.52 .06	6.0 0.4	68.37 .55	74.9 2.7	10.39 .06	55.8 1.5	57.69 —.03	8.2 —0.1
17.4	11.44 .10	6.4 0.4	67.75 .67	77.5 2.4	10.31 .10	57.1 1.3	57.64 .08	8.3 0.2
27.4	11.32 .14	6.8 0.4	67.03 .76	79.7 2.0	10.20 .13	58.3 1.0	57.54 .11	8.5 0.2
Sept. 6.3	11.17 —.17	7.2 —0.4	66.23 —.84	81.5 +1.6	10.05 —.16	59.1 +0.7	57.41 —.14	8.7 —0.2
16.3	10.99 .19	7.6 0.3	65.35 .89	82.8 1.1	9.88 .18	59.7 0.5	57.25 .17	8.9 0.3
26.3	10.79 .20	7.9 0.2	64.43 .93	83.7 0.6	9.70 .18	60.1 +0.2	57.07 .18	9.2 0.3
Oct. 6.2	10.60 .20	8.0 —0.1	63.49 .94	84.0 +0.1	9.52 .19	60.1 —0.1	56.89 .19	9.4 0.2
16.2	10.40 .19	8.1 0.0	62.55 .93	83.8 —0.5	9.31 .19	59.8 0.4	56.70 .18	9.7 0.2
26.2	10.22 —.17	8.1 +0.1	61.64 —.89	83.0 —1.0	9.14 —.17	59.3 —0.7	56.52 —.16	9.9 —0.2
Nov. 5.2	10.07 .13	8.0 0.1	60.77 .82	81.7 1.6	8.98 .15	58.3 1.1	56.37 .14	10.0 0.2
15.1	9.96 .09	7.8 0.2	59.99 .74	79.9 2.1	8.85 .11	57.2 1.3	56.25 .11	10.2 0.2
25.1	9.88 —.05	7.6 0.3	59.30 .62	77.6 2.5	8.75 .08	55.8 1.5	56.16 .06	10.3 0.1
Dec. 5.1	9.85 .00	7.3 0.3	58.74 .49	74.9 2.9	8.70 —.04	54.1 1.8	56.12 —.02	10.5 0.1
15.1	9.87 +.05	7.1 +0.3	58.32 —.35	71.8 —3.2	8.68 +.01	52.3 —1.9	56.11 +.02	10.6 —0.1
25.0	9.94 .09	6.8 0.3	58.05 .19	68.5 3.4	8.71 .05	50.3 2.0	56.16 .06	10.7 0.1
35.0	10.06 +.14	6.5 +0.3	57.94 —.02	64.9 —3.6	8.78 +.08	48.2 —2.1	56.24 +.11	10.9 —0.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Draconis.		$\tau$ Draconis.		$\delta$ Aquilæ.		$\kappa$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 19 <sup>m</sup> 12	<sup>°</sup> +67 <sup>'</sup> 27	<sup>h</sup> 19 <sup>m</sup> 17	<sup>°</sup> +73 <sup>'</sup> 8	<sup>h</sup> 19 <sup>m</sup> 19	<sup>°</sup> + 2 <sup>'</sup> 53	<sup>h</sup> 19 <sup>m</sup> 30	<sup>°</sup> - 7 <sup>'</sup> 16
Jan. 0.0	<sup>s</sup> 28.57 -07	<sup>"</sup> 45.2 -3.5	<sup>s</sup> 41.62 -15	<sup>"</sup> 42.4 -3.4	<sup>s</sup> 40.88 +06	<sup>"</sup> 19.0 -1.4	<sup>s</sup> 41.14 +07	<sup>"</sup> 48.6 -0.8
10.0	28.55 +04	41.6 3.5	41.54 .00	39.0 3.5	40.96 .10	17.6 1.4	41.19 .10	49.4 0.8
20.0	28.65 .15	36.1 3.4	41.61 +14	35.5 3.5	41.08 .14	16.2 1.4	41.31 .13	50.1 0.7
29.9	28.84 .95	34.7 3.3	41.82 .98	32.0 3.3	41.24 .17	14.9 1.9	41.46 .17	50.8 0.6
Feb. 8.9	29.14 .34	31.6 2.9	42.17 .41	28.8 3.0	41.42 .20	13.7 1.0	41.64 .19	51.4 0.5
18.9	29.52 +43	28.8 -2.5	42.64 +53	26.0 -2.6	41.63 +22	12.8 -0.8	41.85 +22	51.8 -0.3
28.9	29.99 .50	26.4 2.0	43.21 .63	23.6 2.1	41.86 .24	12.1 0.5	42.07 .24	52.0 -0.1
Mar. 10.8	30.51 .56	24.7 1.5	43.88 .70	21.7 1.6	42.11 .26	11.7 -0.9	42.32 .26	52.0 +0.1
20.8	31.08 .59	23.5 0.8	44.61 .75	20.5 0.9	42.37 .27	11.6 +0.2	42.59 .27	51.8 0.3
30.8	31.68 .61	23.0 -0.9	45.38 .78	19.9 -0.3	42.65 .28	11.9 0.4	42.86 .28	51.4 0.6
Apr. 9.8	32.20 +61	23.2 +0.5	46.16 +79	19.9 +0.4	42.93 +28	12.4 +0.7	43.15 +28	50.7 +0.8
19.7	32.89 .59	24.0 1.1	46.94 .76	20.6 1.0	43.21 .28	13.3 1.0	43.44 .29	49.9 1.0
29.7	33.47 .56	25.4 1.7	47.68 .72	21.9 1.6	43.50 .28	14.5 1.3	43.73 .29	48.8 1.1
May 9.7	34.00 .51	27.3 2.2	48.36 .66	23.8 2.1	43.77 .27	15.8 1.5	44.01 .28	47.7 1.2
19.6	34.47 .44	29.8 2.7	48.97 .57	26.1 2.6	44.04 .25	17.4 1.6	44.28 .27	46.4 1.3
29.6	34.88 +37	32.6 +3.0	49.49 +47	28.9 +2.9	44.28 +23	19.1 +1.7	44.54 +25	45.1 +1.3
June 8.6	35.20 .28	35.7 3.3	49.89 .35	32.0 3.2	44.50 .21	20.8 1.7	44.78 .22	43.8 1.3
18.6	35.44 .19	39.1 3.4	50.18 .23	35.3 3.4	44.69 .17	22.5 1.7	44.98 .19	42.5 1.2
28.5	35.58 +09	42.6 3.5	50.35 +10	38.7 3.5	44.85 .14	24.2 1.7	45.16 .15	41.3 1.1
July 8.5	35.62 -01	46.1 3.5	50.38 -03	42.2 3.5	44.97 .10	25.8 1.6	45.29 .11	40.2 1.0
18.5	35.56 -11	49.5 +3.4	50.29 -16	45.7 +3.4	45.04 +05	27.3 +1.4	45.38 +07	39.2 +0.9
28.5	35.41 .20	52.8 3.2	50.07 .28	49.0 3.2	45.07 +01	28.7 1.3	45.43 +03	38.4 0.7
Aug. 7.4	35.16 .29	55.9 2.9	49.72 .40	52.1 3.0	45.06 -03	29.9 1.1	45.44 -02	37.8 0.6
17.4	34.82 .37	58.7 2.6	49.26 .50	55.0 2.7	45.01 .07	30.8 0.9	45.40 .06	37.3 0.4
27.4	34.41 .44	61.2 2.3	48.70 .60	57.5 2.3	44.92 .11	31.6 0.7	45.32 .10	36.9 0.3
Sept. 6.3	33.93 -50	63.2 +1.8	48.06 -68	59.7 +2.0	44.79 -14	32.2 +0.5	45.20 -13	36.7 +0.1
16.3	33.40 .55	64.9 1.4	47.34 .74	61.4 1.5	44.64 .16	32.6 0.3	45.06 .16	36.7 0.0
26.3	32.82 .58	66.0 0.9	46.57 .78	62.7 1.0	44.47 .18	32.8 +0.1	44.89 .17	36.7 -0.1
Oct. 6.3	32.23 .59	66.6 +0.4	45.77 .80	63.4 +0.5	44.29 .18	32.8 -0.1	44.71 .17	36.8 0.2
16.2	31.63 .59	66.7 -0.9	44.96 .80	63.6 -0.1	44.11 .18	32.5 0.3	44.54 .17	37.1 0.3
26.2	31.04 -57	66.3 -0.7	44.16 -78	63.3 -0.6	43.94 -16	32.1 -0.5	44.37 -16	37.5 -0.4
Nov. 5.2	30.48 .54	65.2 1.3	43.38 .74	62.4 1.2	43.79 .14	31.5 0.7	44.21 .14	37.9 0.5
15.2	29.96 .48	63.7 1.8	42.67 .67	60.9 1.7	43.66 .11	30.7 0.9	44.09 .11	38.4 0.6
25.1	29.51 .41	61.6 2.3	42.03 .59	59.0 2.2	43.57 .08	29.7 1.1	43.99 .08	39.0 0.6
Dec. 5.1	29.13 .33	59.1 2.7	41.49 .48	56.6 2.6	43.51 -04	28.6 1.2	43.93 .04	39.7 0.7
15.1	28.85 -24	56.1 -3.1	41.05 -38	53.7 -3.0	43.49 .00	27.3 -1.3	43.91 .00	40.5 -0.8
25.0	28.66 .13	52.9 3.4	40.75 .23	50.5 3.3	43.51 +04	25.9 1.4	43.93 +04	41.3 0.8
35.0	28.58 -02	49.4 -3.5	40.58 -09	47.1 -3.5	43.57 +08	24.5 -1.5	43.98 +08	42.1 -0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Aquilæ.		$\alpha$ Aquilæ. (Altair.)		$\epsilon$ Draconis.		$\beta$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 19 40	<sup>m</sup> +10° 20'	<sup>h</sup> 19 45	<sup>m</sup> +8° 33'	<sup>h</sup> 19 48	<sup>m</sup> +69° 58'	<sup>h</sup> 19 49	<sup>m</sup> +6° 7'
Jan. 0.0	46.40 +.05	10.3 -1.8	9.27 +.04	63.8 -1.6	30.36 -.20	44.6 -3.3	38.79 +.03	21.1 -1.5
10.0	46.52 .08	8.5 1.8	9.33 .08	62.1 1.6	30.23 -.07	41.3 3.5	38.85 .07	19.6 1.5
20.0	46.61 .11	6.8 1.7	9.42 .11	60.5 1.6	30.22 +.05	37.8 3.5	38.94 .11	18.1 1.5
30.0	46.74 .15	5.1 1.6	9.55 .14	59.0 1.5	30.33 .17	34.3 3.4	39.06 .14	16.6 1.4
Feb. 8.9	46.90 .17	3.6 1.4	9.71 .17	57.6 1.3	30.55 .98	31.0 3.2	39.22 .17	15.4 1.2
18.9	47.09 +.20	2.3 -1.1	9.89 +.20	56.4 -1.0	30.89 +.39	28.0 -2.8	39.40 +.20	14.3 -0.9
28.9	47.31 .23	1.3 0.8	10.11 .22	55.5 0.7	31.32 .48	25.4 2.4	39.61 .22	13.5 0.7
Mar. 10.9	47.54 .25	0.7 0.5	10.34 .24	54.9 -0.4	31.84 .55	23.2 1.9	39.84 .24	13.0 -0.3
20.8	47.80 .26	0.4 -0.1	10.59 .26	54.7 0.0	32.43 .61	21.6 1.3	40.08 .26	12.8 0.0
30.8	48.07 .28	0.5 +0.3	10.86 .27	54.8 +0.3	33.07 .65	20.6 -0.7	40.35 .27	13.0 +0.4
Apr. 9.8	48.35 +.28	1.0 +0.7	11.14 +.28	55.4 +0.7	33.73 +.67	20.3 0.0	40.63 +.28	13.5 +0.7
19.7	48.63 .29	1.9 1.0	11.43 .29	56.2 1.0	34.41 .67	20.6 +0.6	40.91 .29	14.4 1.0
29.7	48.92 .28	3.1 1.4	11.71 .29	57.4 1.3	35.07 .65	21.5 1.3	41.20 .29	15.5 1.3
May 9.7	49.20 .28	4.6 1.6	12.00 .28	58.9 1.6	35.70 .61	23.1 1.8	41.48 .28	16.9 1.5
19.7	49.47 .26	6.3 1.8	12.27 .27	60.6 1.8	36.28 .55	25.2 2.3	41.76 .27	18.6 1.7
29.6	49.73 +.24	8.2 +2.0	12.53 +.25	62.5 +2.0	36.80 +.47	27.7 +2.7	42.02 +.25	20.4 +1.8
June 8.6	49.96 .22	10.3 2.1	12.77 .22	64.5 2.0	37.23 .39	30.6 3.1	42.26 .23	22.3 1.9
18.6	50.17 .19	12.4 2.1	12.98 .19	66.6 2.0	37.57 .29	33.8 3.3	42.47 .20	24.2 1.9
28.6	50.33 .15	14.5 2.1	13.15 .16	68.6 2.0	37.81 .19	37.2 3.5	42.65 .16	26.1 1.9
July 8.5	50.47 .11	16.5 2.0	13.29 .12	70.6 1.9	37.94 +.08	40.8 3.5	42.79 .12	27.9 1.8
18.5	50.56 +.07	18.5 +1.9	13.38 +.07	72.4 +1.8	37.96 -.03	44.3 +3.5	42.89 +.08	29.7 +1.7
28.5	50.60 +.09	20.3 1.7	13.44 +.03	74.1 1.6	37.87 .14	47.8 3.4	42.95 +.04	31.2 1.5
Aug. 7.4	50.60 -.02	21.9 1.5	13.45 -.01	75.7 1.4	37.68 .25	51.1 3.2	42.96 -.01	32.7 1.3
17.4	50.56 .06	23.3 1.3	13.41 .06	77.0 1.2	37.38 .35	54.2 3.0	42.93 .05	33.9 1.1
27.4	50.48 .10	24.4 1.1	13.33 .10	78.1 1.0	36.99 .44	57.1 2.7	42.86 .09	34.9 0.9
Sept. 6.4	50.36 -.13	25.4 +0.8	13.22 -.13	79.0 +0.8	36.51 -.51	59.6 +2.3	42.75 -.12	35.6 +0.7
16.3	50.21 .16	26.0 0.5	13.08 .15	79.7 0.5	35.96 .57	61.7 1.9	42.62 .15	36.2 0.4
26.3	50.05 .17	26.4 +0.3	12.92 .17	80.1 +0.3	35.36 .62	63.4 1.4	42.46 .17	36.5 +0.2
Oct. 6.3	49.87 .18	26.6 0.0	12.74 .18	80.2 0.0	34.72 .65	64.6 0.9	42.28 .18	36.6 0.0
16.3	49.68 .18	26.5 -0.3	12.56 .18	80.1 -0.2	34.06 .67	65.2 +0.4	42.10 .16	36.4 -0.2
26.2	49.50 -.17	26.1 -0.5	12.38 -.17	79.7 -0.5	33.39 -.66	65.3 -0.2	41.93 -.17	36.1 -0.5
Nov. 5.2	49.34 .15	25.5 0.8	12.22 .15	79.1 0.7	32.74 .64	64.9 0.7	41.76 .15	35.5 0.7
15.2	49.20 .13	24.6 1.0	12.08 .13	78.3 0.9	32.12 .59	63.9 1.3	41.62 .13	34.7 0.9
25.2	49.08 .10	23.4 1.2	11.97 .10	77.2 1.2	31.55 .53	62.3 1.8	41.51 .10	33.7 1.1
Dec. 5.1	49.00 .06	22.1 1.4	11.89 .06	76.0 1.3	31.06 .45	60.2 2.3	41.43 .06	32.5 1.3
15.1	48.97 -.02	20.6 -1.6	11.85 -.02	74.6 -1.5	30.65 -.36	57.7 -2.8	41.39 -.03	31.2 -1.4
25.1	48.96 +.02	18.9 1.7	11.84 +.01	73.0 1.6	30.34 .26	54.7 3.1	41.38 +.01	29.7 1.5
35.0	48.99 +.05	17.1 -1.8	11.87 +.06	71.3 -1.7	30.14 -.15	51.5 -3.4	41.41 +.05	28.2 -1.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\tau$ Aquilæ.		$\alpha^*$ Capricorni.		$\alpha$ Cephei.		$\alpha$ Pavonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 19 <sup>m</sup> 58	+ 6° 57'	<sup>h</sup> 20 <sup>m</sup> 11	-12° 53'	<sup>h</sup> 20 <sup>m</sup> 12	+77° 21'	<sup>h</sup> 20 <sup>m</sup> 16	-57° 5'
Jan. 0.1	30.31 +.03	23.1 -1.6	39.28 +.02	56.0 -0.4	40.31 -.45	69.1 -3.1	30.54 .00	66.9 +2.3
10.0	30.36 .06	21.6 1.5	39.33 .06	56.4 0.3	39.95 .97	65.9 3.3	30.57 +.07	64.7 2.3
20.0	30.44 .10	20.0 1.5	39.41 .10	56.7 0.3	39.77 -.08	62.6 3.4	30.68 .14	62.3 2.4
30.0	30.55 .13	18.6 1.4	39.52 .13	56.9 0.2	39.78 +.11	59.1 3.4	30.85 .30	59.9 2.4
Feb. 9.0	30.70 .16	17.3 1.2	39.67 .16	57.0 -0.1	39.99 .30	55.8 3.3	31.08 .36	57.6 2.4
18.9	30.87 +.19	16.2 -1.0	39.84 +.19	57.0 +0.1	40.37 +.47	52.6 -3.0	31.37 +.31	55.2 +2.3
28.9	31.07 .21	15.3 0.7	40.05 .21	56.8 0.3	40.93 .63	49.7 2.6	31.71 .36	53.0 2.2
Mar. 10.9	31.30 .23	14.8 -0.4	40.27 .24	56.5 0.4	41.64 .77	47.3 2.2	32.09 .40	50.9 2.0
20.8	31.54 .25	14.6 0.0	40.52 .26	56.0 0.6	42.46 .88	45.4 1.6	32.51 .43	48.9 1.8
30.8	31.80 .27	14.8 +0.4	40.78 .27	55.2 0.8	43.39 .96	44.0 1.0	32.96 .46	47.2 1.6
Apr. 9.8	32.08 +.26	15.3 +0.7	41.06 +.26	54.4 +0.9	44.38 1.00	43.3 -0.4	33.44 +.49	45.8 +1.3
19.8	32.36 .29	16.2 1.0	41.35 .30	53.3 1.1	45.40 1.01	43.2 +0.2	33.93 .50	44.6 1.0
29.7	32.65 .29	17.4 1.3	41.65 .30	52.2 1.2	46.41 1.00	43.8 0.9	34.43 .50	43.8 0.7
May 9.7	32.94 .28	18.8 1.6	41.95 .30	50.9 1.2	47.39 .95	44.9 1.4	34.94 .50	43.2 +0.4
19.7	33.22 .27	20.5 1.8	42.25 .29	49.6 1.3	48.30 .86	46.6 2.0	35.43 .48	43.0 0.0
29.7	33.48 +.26	22.3 +1.9	42.53 +.26	48.4 +1.3	49.12 +.76	48.8 +2.4	35.91 +.46	43.2 -0.3
June 8.6	33.73 .23	24.3 2.0	42.80 .25	47.1 1.2	49.82 .63	51.5 2.8	36.35 .42	43.7 0.7
18.6	33.94 .20	26.2 2.0	43.04 .23	46.0 1.1	50.38 .49	54.5 3.1	36.75 .38	44.5 1.0
28.6	34.13 .17	28.2 1.9	43.26 .19	44.9 1.0	50.79 .33	57.8 3.4	37.10 .32	45.7 1.3
July 8.5	34.28 .13	30.1 1.9	43.43 .15	44.0 0.8	51.04 +.17	61.2 3.5	37.39 .25	47.1 1.6
18.5	34.39 +.09	31.9 +1.7	43.57 +.11	43.3 +0.7	51.12 .00	64.7 +3.5	37.61 +.18	48.8 -1.8
28.5	34.45 +.04	33.6 1.6	43.66 .07	42.7 0.5	51.03 -.16	68.3 3.5	37.75 .10	50.7 2.0
Aug. 7.5	34.47 .00	35.1 1.4	43.70 +.02	42.3 0.3	50.78 .33	71.7 3.4	37.82 +.03	52.7 2.0
17.4	34.45 -.04	36.4 1.2	43.70 -.02	42.1 +0.2	50.37 .49	75.0 3.2	37.80 -.05	54.8 2.0
27.4	34.39 .06	37.4 1.0	43.65 .07	42.0 0.0	49.81 .63	78.1 2.9	37.71 .13	56.8 2.0
Sept. 6.4	34.28 -.12	38.3 +0.7	43.57 -.10	42.0 -0.1	49.11 -.76	80.9 +2.6	37.55 -.19	58.8 -1.8
16.4	34.15 .14	38.9 0.5	43.45 .13	42.2 0.2	48.29 .86	83.4 2.3	37.33 .25	60.5 1.6
26.3	34.00 .16	39.3 +0.3	43.30 .16	42.5 0.3	47.38 .05	85.5 1.8	37.05 .30	62.0 1.3
Oct. 6.3	33.82 .17	39.4 0.0	43.13 .17	42.8 0.3	46.40 1.01	87.1 1.4	36.74 .32	63.2 1.0
16.3	33.65 .18	39.3 -0.2	42.96 .17	43.1 0.4	45.36 1.05	88.2 0.9	36.40 .34	64.0 0.6
26.2	33.47 -.17	39.0 -0.4	42.79 -.17	43.5 -0.4	44.29 1.06	88.8 +0.3	36.07 -.32	64.4 -0.2
Nov. 5.2	33.31 .15	38.5 0.7	42.63 .15	44.0 0.4	43.23 1.04	88.8 -0.3	35.74 .31	64.4 +0.2
15.2	33.16 .13	37.7 0.9	42.48 .13	44.4 0.4	42.20 1.00	88.2 0.8	35.44 .26	64.0 0.7
25.2	33.05 .10	36.7 1.1	42.37 .10	44.8 0.5	41.22 .93	87.1 1.4	35.19 .23	63.1 1.1
Dec. 5.1	32.96 .07	35.5 1.3	42.28 .07	45.3 0.5	40.33 .83	85.4 1.9	34.98 .17	61.9 1.4
15.1	32.91 -.03	34.2 -1.3	42.23 -.03	45.7 -0.4	39.56 -.70	83.2 -2.4	34.84 -.11	60.3 +1.7
25.1	32.89 .00	32.8 1.5	42.21 .00	46.2 0.4	38.93 .55	80.6 2.8	34.77 -.04	58.4 2.0
35.1	32.91 +.04	31.2 -1.6	42.24 +.04	46.6 -0.4	38.46 -.38	77.6 -3.1	34.77 +.03	56.3 +2.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Cygni.		$\pi$ Capricorni.		$\epsilon$ Delphini.		Groombridge 3241.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 20 <sup>m</sup> 18	<sup>°</sup> +39 <sup>'</sup> 53	<sup>h</sup> 20 <sup>m</sup> 20	<sup>°</sup> -18 <sup>'</sup> 34	<sup>h</sup> 20 <sup>m</sup> 27	<sup>°</sup> +10 <sup>'</sup> 54	<sup>h</sup> 20 <sup>m</sup> 30	<sup>°</sup> +72 <sup>'</sup> 8
Jan. 0.1	<sup>s</sup> 5.01 -.04	<sup>"</sup> 33.4 -2.8	<sup>s</sup> 43.12 +.03	<sup>"</sup> 72.0 0.0	<sup>s</sup> 42.19 .00	<sup>"</sup> 56.1 -1.6	<sup>s</sup> 27.05 -.34	<sup>"</sup> 48.4 -3.0
10.0	4.99 .00	30.6 2.9	43.16 .06	72.0 0.0	42.21 +.03	54.5 1.6	26.77 .21	45.3 3.2
20.0	5.02 +.05	27.6 2.9	43.24 .09	71.9 +0.1	42.26 .07	52.8 1.6	26.62 -.06	42.0 3.4
30.0	5.09 .10	24.7 2.9	43.35 .13	71.8 0.2	42.34 .10	51.2 1.5	26.61 +.05	38.6 3.4
Feb. 9.0	5.21 .14	21.9 2.7	43.49 .16	71.5 0.3	42.45 .13	49.8 1.4	26.72 .18	35.2 3.3
18.9	5.37 +.18	19.4 -2.4	43.66 +.19	71.1 +0.5	42.60 +.16	48.5 -1.2	26.96 +.31	31.9 -3.1
28.9	5.58 .22	17.1 2.0	43.86 .21	70.6 0.6	42.78 .19	47.5 0.9	27.33 .42	29.0 2.8
Mar. 10.9	5.82 .26	15.3 1.5	44.09 .24	70.0 0.7	42.98 .22	46.8 0.5	27.81 .53	26.4 2.3
20.9	6.09 .29	14.1 1.0	44.33 .26	69.2 0.9	43.21 .24	46.4 -0.2	28.38 .61	24.4 1.8
30.8	6.40 .31	13.3 -0.5	44.60 .28	68.3 1.0	43.45 .26	46.4 +0.2	29.03 .68	22.9 1.2
Apr. 9.8	6.72 +.33	13.1 +0.1	44.89 +.29	67.3 +1.1	43.72 +.27	46.8 +0.6	29.74 +.72	22.0 -0.6
19.8	7.06 .34	13.5 0.7	45.19 .30	66.2 1.2	44.00 .29	47.6 1.0	30.47 .74	21.7 0.0
29.7	7.40 .34	14.4 1.2	45.49 .31	65.0 1.2	44.29 .29	48.8 1.3	31.22 .74	22.1 +0.7
May 9.7	7.74 .34	15.9 1.7	45.80 .31	63.8 1.2	44.59 .29	50.2 1.6	31.95 .79	23.1 1.3
19.7	8.07 .32	17.8 2.1	46.11 .30	62.6 1.2	44.87 .28	51.9 1.8	32.65 .67	24.7 1.9
29.7	8.38 +.30	20.2 +2.5	46.40 +.29	61.4 +1.1	45.15 +.27	53.8 +2.0	33.29 +.60	26.8 +2.3
June 8.6	8.67 .27	22.8 2.8	46.68 .27	60.3 1.0	45.42 .25	55.9 2.1	33.86 .52	29.4 2.7
18.6	8.92 .23	25.7 3.0	46.94 .24	59.4 0.9	45.65 .22	58.1 2.2	34.34 .42	32.3 3.1
28.6	9.13 .19	28.8 3.1	47.17 .21	58.6 0.7	45.86 .19	60.3 2.2	34.71 .32	35.6 3.3
July 8.6	9.29 .14	32.0 3.2	47.36 .17	58.0 0.5	46.04 .15	62.4 2.1	34.97 .20	39.0 3.5
18.5	9.40 +.08	35.2 +3.1	47.50 +.13	57.5 +0.3	46.17 +.11	64.5 +2.0	35.11 +.08	42.5 +3.6
28.5	9.46 +.03	38.3 3.0	47.61 .08	57.3 +0.2	46.26 .07	66.4 1.9	35.13 -.04	46.1 3.6
Aug. 7.5	9.46 -.02	41.3 2.9	47.66 +.03	57.2 0.0	46.30 +.02	68.2 1.7	35.03 .16	49.7 3.5
17.4	9.41 .07	44.0 2.6	47.67 -.02	57.3 -0.2	46.30 -.02	69.8 1.5	34.82 .27	53.1 3.3
27.4	9.32 .12	46.5 2.4	47.63 .06	57.5 0.3	46.26 .06	71.1 1.2	34.49 .38	56.3 3.1
Sept. 6.4	9.17 -.16	48.8 +2.0	47.55 -.10	57.8 -0.4	46.18 -.10	72.2 +1.0	34.06 -.48	59.3 +2.8
16.4	8.99 .20	50.6 1.7	47.44 .13	58.2 0.4	46.06 .13	73.1 0.7	33.53 .56	61.9 2.4
26.3	8.77 .23	52.1 1.3	47.29 .16	58.7 0.5	45.92 .15	73.7 0.5	32.94 .63	64.2 2.0
Oct. 6.3	8.54 .24	53.1 0.8	47.12 .17	59.2 0.5	45.76 .17	74.0 +0.2	32.28 .68	66.0 1.6
16.3	8.29 .25	53.7 +0.4	46.95 .18	59.7 0.5	45.58 .17	74.1 -0.1	31.57 .71	67.3 1.0
26.2	8.04 -.25	53.9 -0.1	46.77 -.17	60.1 -0.4	45.41 -.17	73.9 -0.3	30.85 -.73	68.0 +0.5
Nov. 5.2	7.79 .24	53.5 0.6	46.61 .16	60.5 0.4	45.24 .16	73.4 0.6	30.12 .72	68.3 0.0
15.2	7.56 .22	52.7 1.1	46.46 .14	60.9 0.3	45.09 .14	72.7 0.8	29.40 .70	67.9 -0.6
25.2	7.36 .19	51.4 1.5	46.33 .11	61.2 0.3	44.95 .12	71.8 1.1	28.72 .65	67.0 1.2
Dec. 5.1	7.18 -.16	49.7 -1.9	46.24 -.08	61.5 -0.2	44.85 -.09	70.6 1.3	28.09 .59	65.5 1.8
15.1	7.04 -.12	47.5 -2.3	46.18 -.04	61.7 -0.2	44.77 -.06	69.2 -1.4	27.54 -.50	63.4 -2.3
25.1	6.95 .07	45.1 2.6	46.16 .00	61.8 0.1	44.73 -.02	67.7 1.6	27.09 .40	60.9 2.7
35.1	6.90 -.02	42.3 -2.9	46.17 +.03	61.9 -0.1	44.72 +.01	66.1 -1.7	26.73 -.29	58.0 -3.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Cygni.		$\mu$ Aquarii.		12 Year Cat. 1879.		$\nu$ Cygni.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 20 37	+44° 52'	<sup>h</sup> <sup>m</sup> 20 46	— 9° 24'	<sup>h</sup> <sup>m</sup> 20 52	+80° 7'	<sup>h</sup> <sup>m</sup> 20 52	+40° 43'
Jan. 0.1	<sup>s</sup> 29.60 —.08	25.4 —2.8	<sup>s</sup> 26.03 .00	46.2 —0.5	<sup>s</sup> 42.13 —.78	32.2 —2.6	<sup>s</sup> 52.20 —.09	43.4 —2.7
10.1	29.54 —.03	22.6 2.9	26.04 +.03	46.7 0.5	41.45 .57	29.4 3.0	52.14 —.04	40.8 2.7
20.0	29.53 +.08	19.6 3.0	26.09 .06	47.1 0.4	40.99 .34	26.3 3.2	52.12 +.01	38.0 2.8
30.0	29.57 .07	16.6 3.0	26.16 .09	47.5 0.3	40.76 —.11	23.0 3.3	52.15 .05	35.1 2.8
Feb. 9.0	29.67 .12	13.6 2.9	26.27 .12	47.7 —0.2	40.78 +.14	19.6 3.3	52.22 .10	32.3 2.7
19.0	29.81 +.17	10.9 —2.6	26.41 +.15	47.8 0.0	41.04 +.38	16.3 —3.2	52.35 +.14	29.7 —2.5
28.9	30.00 .21	8.4 2.3	26.58 .18	47.7 +0.2	41.53 .60	13.2 2.9	52.51 .19	27.3 2.2
Mar. 10.9	30.24 .26	6.4 1.8	26.77 .21	47.4 0.4	42.24 .80	10.4 2.6	52.72 .23	25.3 1.8
20.9	30.51 .29	4.8 1.3	26.99 .23	46.9 0.6	43.14 .98	8.1 2.1	52.97 .27	23.8 1.3
30.8	30.82 .32	3.7 0.7	27.23 .26	46.2 0.8	44.19 1.11	6.3 1.5	53.25 .30	22.7 0.8
Apr. 9.8	31.15 +.34	3.3 —0.2	27.49 +.27	45.2 +1.0	45.36 1.21	5.0 —1.0	53.56 +.32	22.3 —0.2
19.8	31.51 .36	3.4 +0.4	27.77 .29	44.1 1.2	46.61 1.26	4.3 —0.3	53.89 .34	22.4 +0.4
29.8	31.87 .37	4.1 1.0	28.07 .30	42.8 1.3	47.89 1.27	4.3 +0.2	54.24 .35	23.0 0.9
May 9.7	32.24 .36	5.4 1.5	28.36 .30	41.4 1.4	49.16 1.25	4.9 0.9	54.59 .35	24.2 1.4
19.7	32.60 .35	7.1 2.0	28.66 .30	39.9 1.5	50.38 1.18	6.1 1.5	54.93 .34	25.8 1.9
29.7	32.94 +.33	9.4 +2.4	28.96 +.29	38.4 +1.5	51.51 1.07	7.8 +2.0	55.27 +.32	27.9 +2.3
June 8.6	33.25 .30	12.0 2.8	29.24 .27	36.9 1.6	52.53 .94	10.1 2.5	55.58 .30	30.4 2.6
18.6	33.53 .26	14.9 3.0	29.50 .25	35.5 1.4	53.39 .78	12.7 2.8	55.87 .27	33.2 2.9
28.6	33.77 .21	18.0 3.2	29.73 .22	34.1 1.3	54.08 .60	15.7 3.1	56.11 .22	36.2 3.1
July 8.6	33.96 .16	21.2 3.3	29.93 .18	32.9 1.1	54.59 .40	19.0 3.4	56.32 .18	39.3 3.2
18.5	34.10 +.11	24.6 +3.3	30.10 +.14	31.9 +1.0	54.89 +.20	22.4 +3.5	56.47 +.13	42.5 +3.2
28.5	34.18 +.05	27.8 3.2	30.22 .10	31.0 0.8	54.98 —.01	26.0 3.6	56.57 .08	45.7 3.1
Aug. 7.5	34.20 —.01	31.0 3.1	30.29 .05	30.4 0.6	54.86 .22	29.6 3.6	56.62 +.02	48.8 3.0
17.5	34.16 .06	34.0 2.9	30.32 +.01	29.9 0.4	54.54 .42	33.1 3.5	56.61 —.03	51.8 2.8
27.4	34.07 .12	36.8 2.6	30.31 —.04	29.6 +0.2	54.02 .61	36.5 3.3	56.55 .08	54.5 2.6
Sept. 6.4	33.93 —.16	39.3 +2.3	30.25 —.08	29.5 0.0	53.32 —.79	39.7 +3.1	56.44 —.13	57.0 +2.3
16.4	33.75 .20	41.5 2.0	30.16 .11	29.5 —0.1	52.45 .94	42.6 2.8	56.29 .17	59.1 2.0
26.3	33.53 .23	43.3 1.6	30.03 .14	29.7 0.2	51.43 1.08	45.2 2.4	56.11 .20	60.9 1.6
Oct. 6.3	33.28 .25	44.6 1.1	29.89 .15	29.9 0.3	50.29 1.19	47.4 2.0	55.89 .22	62.3 1.2
16.3	33.02 .27	45.5 0.7	29.73 .16	30.3 0.4	49.06 1.27	49.1 1.5	55.66 .24	63.3 0.7
26.3	32.75 —.27	46.0 +0.2	29.56 —.16	30.7 —0.5	47.75 1.22	50.4 +0.9	55.42 —.24	63.8 +0.3
Nov. 5.2	32.48 .26	45.9 —0.3	29.40 .15	31.2 0.5	46.41 1.34	51.1 +0.3	55.17 .24	63.8 —0.2
15.2	32.22 .25	45.3 0.8	29.25 .14	31.8 0.6	45.07 1.33	51.1 —0.2	54.94 .23	63.4 0.7
25.2	31.98 .22	44.2 1.3	29.12 .19	32.4 0.6	43.76 1.27	50.7 0.8	54.72 .21	62.4 1.2
Dec. 5.2	31.77 .19	42.7 1.8	29.02 .09	33.0 0.6	42.52 1.18	49.6 1.4	54.52 .18	61.1 1.6
15.1	31.59 —.15	40.6 —2.2	28.94 —.06	33.5 —0.6	41.39 1.06	48.0 —1.9	54.36 —.15	59.2 —2.0
25.1	31.46 .11	38.3 2.5	28.90 —.03	34.1 0.6	40.41 .90	45.9 2.4	54.23 .11	57.1 2.4
35.1	31.37 —.06	35.6 —2.8	28.89 +.01	34.7 —0.5	39.60 —.70	43.3 —2.9	54.14 —.07	54.5 —2.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	61 <sup>1</sup> Cygni.		ζ Cygni.		α Cephei.		1 Pegasi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 21 <sup>m</sup> 1	+38° 10'	<sup>h</sup> 21 <sup>m</sup> 8	+29° 45'	<sup>h</sup> 21 <sup>m</sup> 15	+62° 5'	<sup>h</sup> 21 <sup>m</sup> 16	+19° 18'
Jan. 0.1	<sup>s</sup> 43.66 -07	77.5 -2.3	<sup>s</sup> 1.69 -06	32.5 -2.3	<sup>s</sup> 48.84 -25	72.7 -2.6	<sup>s</sup> 45.32 -05	56.8 -1.8
10.1	43.61 -03	75.0 2.5	1.64 -03	30.3 2.3	48.62 .18	70.0 2.9	45.28 -02	54.9 1.9
20.0	43.60 +01	72.4 2.6	1.63 +01	28.0 2.4	48.48 .11	66.9 3.1	45.27 +01	53.0 1.9
30.0	43.63 .05	69.8 2.6	1.66 .04	25.5 2.4	48.41 -03	63.7 3.3	45.30 .04	51.1 1.9
Feb. 9.0	43.70 .10	67.2 2.5	1.72 .08	23.2 2.3	48.43 +06	60.4 3.2	45.36 .08	49.3 1.8
19.0	43.82 +14	64.7 -2.3	1.82 +12	21.0 -2.1	48.52 +14	57.2 -3.1	45.46 +11	47.6 -1.6
28.9	43.99 .18	62.5 2.0	1.96 .16	19.0 1.8	48.70 .28	54.2 2.9	45.59 .15	46.2 1.3
Mar. 10.9	44.19 .22	60.7 1.6	2.14 .20	17.4 1.4	48.96 .29	51.5 2.5	45.75 .18	45.0 1.0
20.9	44.43 .26	59.2 1.2	2.35 .23	16.2 1.0	49.29 .36	49.2 2.0	45.94 .21	44.2 0.6
30.9	44.71 .29	58.3 0.7	2.60 .26	15.4 -0.5	49.68 .42	47.4 1.5	46.17 .24	43.8 -0.2
Apr. 9.8	45.01 +22	57.9 -0.1	2.87 +22	15.2 0.0	50.12 +46	46.2 -0.9	46.42 +26	43.9 +0.3
19.8	45.34 .34	58.1 +0.4	3.16 .30	15.4 +0.5	50.61 .50	45.6 -0.3	46.69 .28	44.3 0.7
29.8	45.69 .35	58.8 1.0	3.47 .31	16.1 1.0	51.11 .51	45.6 +0.3	46.98 .30	45.2 1.1
May 9.7	46.04 .35	60.0 1.5	3.79 .32	17.3 1.4	51.63 .52	46.2 0.9	47.28 .30	46.5 1.4
19.7	46.39 .35	61.7 1.9	4.11 .32	18.9 1.8	52.15 .51	47.4 1.5	47.59 .30	48.1 1.8
29.7	46.73 +33	63.8 +2.3	4.42 +31	20.9 +2.9	52.64 +48	49.2 +2.0	47.89 +30	50.1 +2.1
June 8.7	47.05 .31	66.3 2.7	4.72 .29	23.2 2.4	53.11 .44	51.4 2.5	48.18 .28	52.2 2.3
18.6	47.35 .28	69.1 2.9	5.00 .26	25.8 2.6	53.53 .39	54.0 2.9	48.45 .26	54.6 2.4
28.6	47.61 .24	72.1 3.1	5.24 .23	28.5 2.8	53.89 .33	57.1 3.2	48.70 .23	57.0 2.5
July 8.6	47.83 .20	75.3 3.2	5.45 .19	31.4 2.9	54.18 .26	60.4 3.4	48.91 .19	59.6 2.5
18.6	48.00 +15	78.5 +3.2	5.62 +15	34.2 +2.9	54.41 +18	63.8 +3.6	49.09 +16	62.0 +2.5
28.5	48.12 .10	81.7 3.2	5.74 .10	37.1 2.8	54.55 .10	67.4 3.6	49.22 .11	64.5 2.3
Aug. 7.5	48.19 +04	84.8 3.1	5.82 +05	39.8 2.7	54.61 +02	71.0 3.6	49.31 .07	66.7 2.2
17.5	48.21 -01	87.8 2.9	5.84 .00	42.4 2.5	54.59 -02	74.5 3.5	49.35 +02	68.9 2.0
27.4	48.18 .06	90.6 2.6	5.82 -04	44.7 2.3	54.49 .14	77.9 3.3	49.35 -02	70.8 1.9
Sept. 6.4	48.10 -10	93.1 +2.4	5.76 -09	46.9 +2.0	54.32 -21	81.1 +3.1	49.30 -07	72.4 +1.5
16.4	47.97 .14	95.3 2.0	5.65 .13	48.7 1.7	54.08 .27	84.0 2.8	49.22 .10	73.9 1.3
26.4	47.82 .17	97.2 1.7	5.50 .15	50.2 1.3	53.78 .32	86.6 2.4	49.10 .13	75.0 1.0
Oct. 6.3	47.63 .20	98.7 1.3	5.34 .18	51.4 1.0	53.43 .37	88.8 2.0	48.96 .15	75.8 0.7
16.3	47.42 .21	99.7 0.9	5.15 .19	52.2 0.6	53.04 .40	90.5 1.5	48.80 .16	76.3 +0.4
26.3	47.20 -22	100.4 +0.4	4.95 -20	52.6 +0.2	52.63 -42	91.8 +1.0	48.63 -17	76.5 0.0
Nov. 5.3	46.98 .22	100.5 -0.1	4.76 .20	52.6 -0.2	52.20 .43	92.5 +0.4	48.46 .17	76.4 -0.3
15.2	46.77 .21	100.3 0.5	4.56 .18	52.2 0.6	51.77 .43	92.6 -0.1	48.30 .16	76.0 0.6
25.2	46.57 .19	99.5 1.0	4.39 .17	51.3 1.0	51.35 .41	92.2 0.7	48.14 .15	75.2 0.9
Dec. 5.2	46.39 .16	98.3 1.4	4.23 .15	50.1 1.4	50.95 .38	91.2 1.3	48.00 .13	74.2 1.2
15.1	46.24 -13	96.7 -1.8	4.09 -12	48.6 -1.7	50.59 -34	89.6 -1.8	47.89 -10	72.8 -1.4
25.1	46.13 .10	94.7 2.1	3.99 .09	46.7 2.0	50.27 .28	87.6 2.3	47.80 .07	71.3 1.7
35.1	46.05 -06	92.5 -2.2	3.92 -05	44.6 -2.2	50.02 -23	85.1 -2.7	47.74 -04	69.5 -1.9



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Aquarii.		$\beta$ Cephei.		$\xi$ Aquarii.		$\epsilon$ Pegasi.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> <sub>21</sub> <sup>m</sup> <sub>25</sub>	— 6° 4'	<sup>h</sup> <sub>21</sub> <sup>m</sup> <sub>27</sub>	+70° 3'	<sup>h</sup> <sub>21</sub> <sup>m</sup> <sub>31</sub>	— 8° 21'	<sup>h</sup> <sub>21</sub> <sup>m</sup> <sub>38</sub>	+ 9° 20'
Jan. 0.1	<sup>s</sup> <sub>29.43</sub> —.04	31.5 —0.7	<sup>s</sup> <sub>8.83</sub> —.40	40.7 —2.4	<sup>s</sup> <sub>36.94</sub> —.04	66.5 —0.5	<sup>s</sup> <sub>31.60</sub> —.05	61.1 —1.3
10.1	29.40 —.01	32.2 0.6	8.47 .31	38.1 2.8	36.91 —.01	67.0 0.5	31.56 —.03	59.7 1.3
20.1	29.41 +.02	32.8 0.5	8.20 .21	35.1 3.1	36.91 +.02	67.5 0.4	31.54 .00	58.4 1.3
30.0	29.45 .05	33.2 0.4	8.04 —.10	31.9 3.3	36.94 .05	67.8 0.3	31.56 +.03	57.1 1.3
Feb. 9.0	29.51 .08	33.6 0.3	8.00 +.01	28.6 3.3	37.00 .08	68.0 —0.1	31.60 .06	55.8 1.2
19.0	29.61 +.11	33.8 —0.1	8.07 +.13	25.3 —3.2	37.09 +.11	68.1 +0.1	31.68 +.09	54.7 —1.0
28.9	29.73 .14	33.8 +0.1	8.26 .24	22.1 3.0	37.22 .14	67.9 0.3	31.79 .12	53.8 0.8
Mar. 10.9	29.89 .17	33.6 0.3	8.56 .35	19.2 2.7	37.37 .17	67.6 0.5	31.93 .16	53.2 0.5
20.9	30.08 .20	33.1 0.6	8.96 .45	16.7 2.3	37.55 .20	67.0 0.7	32.10 .19	52.8 —0.2
30.9	30.29 .23	32.4 0.8	9.45 .53	14.6 1.8	37.76 .23	66.2 0.9	32.30 .22	52.8 +0.2
Apr. 9.8	30.53 +.25	31.5 +1.0	10.03 +.60	13.1 —1.2	38.00 +.25	65.2 +1.1	32.53 +.24	53.2 +0.5
19.8	30.79 .27	30.4 1.2	10.65 .65	12.2 —0.6	38.26 .27	63.9 1.3	32.79 .27	53.9 0.9
29.8	31.08 .29	29.0 1.4	11.31 .67	11.9 0.0	38.54 .29	62.5 1.5	33.06 .28	54.9 1.2
May 9.8	31.36 .30	27.5 1.6	12.00 .68	12.2 +0.6	38.83 .30	61.0 1.6	33.35 .29	56.3 1.5
19.7	31.66 .30	25.9 1.7	12.68 .67	13.2 1.2	39.13 .30	59.4 1.7	33.65 .30	57.9 1.7
29.7	31.96 +.30	24.2 +1.7	13.34 +.63	14.7 +1.8	39.44 +.30	57.7 +1.7	33.95 +.30	59.7 +1.9
June 8.7	32.26 .29	22.5 1.7	13.95 .58	16.7 2.3	39.73 .29	56.0 1.7	34.24 .29	61.7 2.1
18.6	32.54 .27	20.8 1.6	14.50 .52	19.2 2.7	40.01 .27	54.4 1.6	34.52 .27	63.8 2.1
28.6	32.79 .24	19.2 1.5	14.98 .44	22.1 3.0	40.28 .25	52.8 1.5	34.78 .24	66.0 2.2
July 8.6	33.02 .21	17.7 1.4	15.37 .35	25.3 3.3	40.51 .22	51.4 1.3	35.00 .21	68.1 2.1
18.6	33.21 +.17	16.4 +1.2	15.67 +.24	28.7 +3.5	40.71 +.18	50.2 +1.1	35.21 +.18	70.2 +2.0
28.5	33.36 .13	15.2 1.1	15.86 .14	32.3 3.6	40.87 .14	49.2 0.9	35.36 .14	72.2 1.9
Aug. 7.5	33.47 .09	14.3 0.8	15.95 +.03	36.0 3.6	40.99 .09	48.3 0.7	35.48 .09	74.0 1.7
17.5	33.54 +.04	13.5 0.6	15.92 —.08	39.6 3.6	41.06 +.05	47.7 0.5	35.54 .05	75.7 1.5
27.5	33.56 .00	13.0 0.4	15.80 .18	43.1 3.5	41.09 .00	47.3 0.3	35.57 +.01	77.1 1.3
Sept. 6.4	33.54 —.04	12.7 +0.2	15.57 —.27	46.5 +3.3	41.07 —.04	47.1 +0.1	35.56 —.04	78.3 +1.1
16.4	33.48 .08	12.5 0.0	15.25 .36	49.7 3.0	41.01 .07	47.1 —0.1	35.50 .07	79.3 0.9
26.4	33.38 .11	12.6 —0.1	14.85 .44	52.5 2.7	40.92 .10	47.2 0.2	35.41 .10	80.0 0.6
Oct. 6.3	33.26 .13	12.8 0.3	14.37 .51	55.0 2.3	40.81 .13	47.5 0.3	35.30 .13	80.5 0.4
16.3	33.12 .15	13.1 0.4	13.84 .56	57.0 1.8	40.67 .14	47.9 0.4	35.16 .14	80.7 +0.1
26.3	32.97 —.15	13.5 —0.5	13.26 —.59	58.6 +1.3	40.52 —.15	48.4 —0.5	35.01 —.15	80.7 —0.1
Nov. 5.3	32.82 .15	14.0 0.6	12.65 .61	59.6 0.7	40.37 .15	49.0 0.6	34.86 .15	80.5 0.3
15.2	32.67 .14	14.6 0.6	12.03 .62	60.0 +0.2	40.22 .14	49.6 0.6	34.71 .15	80.0 0.6
25.2	32.53 .13	15.2 0.7	11.42 .60	59.9 —0.4	40.08 .13	50.2 0.6	34.56 .14	79.4 0.8
Dec. 5.2	32.41 .11	15.9 0.7	10.83 .57	59.1 1.0	39.97 —.11	50.8 0.6	34.44 .12	78.5 1.0
15.2	32.32 —.08	16.6 —0.7	10.28 —.52	57.8 —1.6	39.87 —.09	51.5 —0.6	34.33 —.10	77.5 —1.1
25.1	32.25 .06	17.3 0.7	9.79 .45	56.0 2.1	39.79 .06	52.1 0.6	34.24 .07	76.3 1.3
35.1	32.20 —.03	18.0 —0.7	9.38 —.36	53.6 —2.6	39.75 —.03	52.6 —0.6	34.18 —.05	75.0 —1.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	11 Cephei.		$\mu$ Capricorni.		79 Draconis.		$\alpha$ Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 21 <sup>m</sup> 40	+70° 46'	<sup>h</sup> 21 <sup>m</sup> 47	-14° 5'	<sup>h</sup> 21 <sup>m</sup> 51	+73° 9'	<sup>h</sup> 21 <sup>m</sup> 59	- 0° 52'
Jan. 0.1	12.80 -44	75.2 -2.2	0.68 -0.06	32.1 -0.3	24.71 -54	50.4 -2.1	51.96 -0.06	37.0 -0.8
10.1	12.40 .36	72.8 2.7	0.64 -0.02	32.3 -0.2	24.21 .44	48.1 2.5	51.91 .04	37.9 0.8
20.1	12.09 .28	69.9 3.0	0.62 .00	32.4 0.0	23.92 .33	45.3 2.9	51.88 -.01	38.7 0.8
30.0	11.89 .14	66.8 3.2	0.64 +0.03	32.4 +0.1	23.55 .21	42.3 3.2	51.89 +0.02	39.4 0.7
Feb. 9.0	11.80 -03	63.5 2.3	0.69 .06	32.2 0.3	23.40 -0.08	39.0 3.3	51.91 .04	40.0 0.5
19.0	11.84 +10	60.2 -3.3	0.77 +0.09	31.9 +0.4	23.39 +0.06	35.7 -3.3	51.97 +0.08	40.5 -0.4
Mar. 1.0	11.99 .29	57.0 3.1	0.88 .13	31.4 0.6	23.53 .90	32.5 3.1	52.07 .11	40.7 -0.1
10.9	12.27 .33	54.0 2.8	1.02 .16	30.7 0.8	23.90 .34	29.4 2.9	52.18 .14	40.7 +0.1
20.9	12.65 .44	51.4 2.4	1.19 .19	29.7 1.0	24.20 .46	26.7 2.5	52.34 .17	40.6 0.4
30.9	13.14 .53	49.2 1.9	1.40 .22	28.7 1.2	24.71 .57	24.4 2.1	52.52 .20	40.1 0.6
Apr. 9.9	13.71 +00	47.6 -1.4	1.63 +0.24	27.4 +1.4	25.33 +0.66	22.5 -1.5	52.74 +0.23	39.3 +0.9
19.8	14.34 .66	46.5 0.8	1.88 .26	25.9 1.5	26.02 .72	21.3 1.0	52.98 .25	38.3 1.2
29.8	15.02 .69	46.0 -0.1	2.16 .29	24.4 1.6	26.77 .77	20.6 -0.4	53.24 .27	37.0 1.4
May 9.8	15.72 .70	46.1 +0.5	2.45 .30	22.8 1.7	27.56 .79	20.6 +0.3	53.53 .29	35.5 1.6
19.7	16.43 .70	46.9 1.1	2.76 .31	21.1 1.7	28.35 .79	21.1 0.9	53.82 .30	33.8 1.7
29.7	17.12 +07	48.2 +1.6	3.07 +0.31	19.4 +1.7	29.13 +0.76	22.3 +1.5	54.12 +0.26	32.0 +1.8
June 8.7	17.77 .62	50.1 2.1	3.38 .26	17.8 1.6	29.87 .71	24.0 2.0	54.42 .30	30.2 1.8
18.7	18.36 .56	52.5 2.6	3.67 .29	16.2 1.5	30.55 .64	26.2 2.4	54.71 .28	28.3 1.9
28.6	18.98 .48	55.3 2.9	3.95 .26	14.9 1.3	31.16 .56	28.9 2.8	54.96 .26	26.4 1.8
July 8.6	19.32 .30	58.4 3.2	4.20 .23	13.7 1.1	31.67 .46	31.9 3.1	55.23 .23	24.6 1.7
18.6	19.66 +29	61.7 +3.5	4.42 +0.20	12.7 +0.9	32.08 +0.25	35.2 +3.4	55.45 +0.20	23.0 +1.6
28.6	19.89 .18	65.3 3.6	4.60 .16	11.9 0.7	32.36 .23	38.7 3.6	55.62 .16	21.5 1.4
Aug. 7.5	20.02 +07	68.9 3.7	4.73 .11	11.3 0.4	32.53 +0.11	42.3 3.7	55.76 .12	20.2 1.2
17.5	20.03 -04	72.6 3.6	4.92 .07	11.1 +0.2	32.58 -0.01	46.0 3.7	55.86 .07	19.1 1.0
27.5	19.94 .15	76.2 3.5	4.96 +0.02	11.0 0.0	32.50 .14	49.7 3.6	55.91 +0.03	18.2 0.8
Sept. 6.4	19.74 -25	79.7 +3.4	4.86 -0.02	11.1 -0.2	32.31 -0.25	53.2 +3.5	55.92 -.01	17.5 +0.6
16.4	19.44 .34	82.9 3.1	4.92 .06	11.4 0.4	32.00 .26	56.6 3.2	55.89 .06	17.1 0.3
26.4	19.06 .49	85.9 2.8	4.75 .09	11.8 0.5	31.59 .45	59.7 3.0	55.82 .08	16.8 +0.1
Oct. 6.4	18.60 .49	88.5 2.4	4.64 .12	12.4 0.6	31.09 .54	62.5 2.6	55.72 .11	16.8 -0.1
16.3	18.07 .55	90.7 2.0	4.51 .14	13.0 0.6	30.51 .61	64.8 2.2	55.61 .13	16.9 0.2
26.3	17.49 -00	92.5 +1.5	4.36 -0.15	13.7 -0.7	29.87 -0.67	66.8 +1.7	55.47 -0.14	17.2 -0.4
Nov. 5.3	16.88 .62	93.7 0.9	4.21 .15	14.4 0.7	29.18 .70	68.2 1.2	55.33 .14	17.6 0.5
15.3	16.25 .63	94.4 +0.4	4.06 .15	15.0 0.6	28.46 .72	69.1 +0.6	55.19 .14	18.2 0.6
25.2	15.61 .63	94.5 -0.2	3.92 .13	15.6 0.6	27.74 .72	69.4 0.0	55.05 .13	18.8 0.7
Dec. 5.2	15.00 .60	93.9 0.8	3.80 .12	16.2 -0.5	27.02 .70	69.0 -0.6	54.93 .12	19.6 0.8
15.2	14.42 -55	92.8 -1.4	3.69 -0.09	16.7 -0.5	26.34 -0.66	68.1 -1.2	54.82 -0.10	20.4 -0.8
25.1	13.89 .49	91.1 1.9	3.61 .07	17.1 0.3	25.71 .59	66.6 1.8	54.73 .08	21.2 0.8
35.1	13.43 -42	88.9 -2.4	3.55 -0.04	17.4 -0.2	25.15 -0.50	64.6 -2.3	54.66 -0.06	22.1 -0.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Gruis.		$\theta$ Aquarii.		$\pi$ Aquarii.		$\eta$ Aquarii.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 22 <sup>m</sup> 0	—47° 30'	<sup>h</sup> 22 <sup>m</sup> 10	— 8° 20'	<sup>h</sup> 22 <sup>m</sup> 19	+ 0° 47'	<sup>h</sup> 22 <sup>m</sup> 29	— 0° 42'
Jan. 0.1	57.22 —.12	68.6 +1.2	45.21 —.07	78.2 —0.5	23.69 —.08	43.1 —0.9	26.29 —.08	32.5 —0.8
10.1	57.12 .08	67.2 1.5	45.15 .05	78.7 0.5	23.62 .06	42.2 0.9	26.21 .06	33.3 0.8
20.1	57.07 —.03	65.5 1.8	45.11 —.02	79.1 0.4	23.58 —.03	41.4 0.8	26.16 .04	34.1 0.7
30.1	57.06 +.01	63.6 2.1	45.11 +.02	79.4 0.2	23.56 .00	40.6 0.7	26.14 —.01	34.8 0.6
Feb. 9.0	57.09 .06	61.4 2.2	45.13 .04	79.5 —0.1	23.57 +.02	40.0 0.6	26.14 +.02	35.3 0.5
19.0	57.17 +.10	59.1 +2.4	45.18 +.07	79.5 +0.1	23.61 +.05	39.4 —0.5	26.17 +.04	35.8 —0.3
Mar. 1.0	57.29 .15	56.6 2.5	45.26 .10	79.3 0.3	23.68 .09	39.1 —0.3	26.23 .08	36.0 —0.1
11.0	57.46 .19	54.1 2.5	45.38 .13	78.9 0.5	23.78 .12	38.9 0.0	26.32 .11	36.0 +0.1
20.9	57.68 .24	51.6 2.5	45.52 .16	78.2 0.8	23.92 .15	39.1 +0.3	26.44 .14	35.8 0.4
30.9	57.94 .28	49.1 2.5	45.70 .19	77.3 1.0	24.09 .18	39.5 0.6	26.60 .18	35.3 0.6
Apr. 9.9	58.23 +.31	46.6 +2.4	45.91 +.22	76.2 +1.2	24.29 +.21	40.2 +0.8	26.80 +.21	34.5 +0.9
19.8	58.57 .35	44.3 2.2	46.15 .25	74.9 1.4	24.51 .24	41.1 1.1	27.02 .24	33.5 1.2
29.8	58.93 .38	42.2 2.0	46.41 .27	73.4 1.6	24.77 .27	42.4 1.4	27.27 .26	32.2 1.4
May 9.8	59.32 .40	40.3 1.8	46.69 .29	71.8 1.7	25.05 .28	43.8 1.6	27.54 .28	30.7 1.6
19.8	59.73 .41	38.7 1.5	46.99 .30	70.1 1.8	25.34 .30	45.5 1.7	27.83 .30	29.1 1.8
29.7	60.14 +.41	37.4 +1.1	47.29 +.31	68.3 +1.2	25.64 +.30	47.3 +1.9	28.13 +.30	27.2 +1.9
June 8.7	60.56 .41	36.4 0.8	47.60 .30	66.5 1.8	25.94 .30	49.2 1.9	28.44 .30	25.3 1.9
18.7	60.96 .39	35.8 +0.4	47.90 .29	64.7 1.7	26.24 .29	51.2 2.0	28.73 .29	23.4 1.9
28.7	61.34 .36	35.6 0.0	48.18 .27	63.1 1.6	26.52 .27	53.1 1.9	29.02 .27	21.5 1.9
July 8.6	61.68 .33	35.8 —0.4	48.44 .24	61.5 1.4	26.78 .24	55.0 1.8	29.28 .25	19.6 1.8
18.6	61.99 +.28	36.3 —0.8	48.66 +.21	60.2 +1.2	27.00 +.21	56.7 +1.7	29.52 +.22	17.9 +1.6
28.6	62.25 .23	37.3 1.1	48.86 .17	59.0 1.0	27.20 .17	58.4 1.5	29.72 .18	16.4 1.5
Aug. 7.5	62.44 .17	38.5 1.4	49.01 .13	58.1 0.8	27.35 .13	59.8 1.3	29.89 .14	15.0 1.3
17.5	62.58 .10	40.0 1.7	49.12 .09	57.4 0.6	27.47 .09	61.0 1.1	30.01 .10	13.8 1.0
27.5	62.65 +.04	41.8 1.9	49.18 +.04	57.0 0.3	27.53 .05	62.0 0.9	30.09 .06	12.9 0.8
Sept. 6.5	62.66 —.02	43.8 —1.2	49.20 .00	56.7 +0.1	27.56 +.01	62.8 +0.7	30.13 +.02	12.2 +0.6
16.4	62.61 .06	45.7 2.0	49.19 —.04	56.7 —0.1	27.55 —.03	63.4 0.5	30.12 —.02	11.7 0.4
26.4	62.50 .13	47.7 1.9	49.13 .07	56.9 0.2	27.50 .06	63.7 +0.2	30.08 .06	11.5 +0.2
Oct. 6.4	62.35 .17	49.6 1.8	49.04 .10	57.2 0.4	27.42 .09	63.9 0.0	30.01 .08	11.4 0.0
16.4	62.15 .21	51.3 1.6	48.93 .12	57.6 0.5	27.32 .11	63.8 —0.1	29.92 .11	11.5 —0.2
26.3	61.93 —.23	52.7 —1.3	48.80 —.13	58.2 —0.6	27.20 —.13	63.6 —0.3	29.80 —.12	11.8 —0.4
Nov. 5.3	61.69 .24	53.9 1.0	48.66 .14	58.8 0.6	27.06 .14	63.2 0.4	29.68 .13	12.2 0.5
15.3	61.45 .24	54.7 0.6	48.52 .14	59.5 0.7	26.92 .14	62.7 0.6	29.54 .13	12.8 0.6
25.2	61.22 .23	55.1 —0.2	48.39 .13	60.2 0.7	26.79 .13	62.0 0.7	29.41 .13	13.4 0.7
Dec. 5.2	61.00 .20	55.1 +0.2	48.26 .12	60.8 0.7	26.66 .12	61.3 0.8	29.28 .12	14.2 0.8
15.2	60.81 —.18	54.7 +0.6	48.15 —.10	61.5 —0.6	26.55 —.11	60.5 —0.8	29.16 —.11	14.9 —0.8
25.2	60.65 .14	53.9 1.0	48.05 .08	62.1 0.6	26.45 .09	59.7 0.9	29.06 .09	15.7 0.8
35.1	60.54 —.08	52.8 +1.3	47.98 —.06	62.7 —0.6	26.37 —.07	58.8 —0.9	28.98 —.08	16.6 —0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	226 Cephei (B.)		ζ Pegasi.		ι Cephei.		λ Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 22 30	+ 75° 37'	<sup>h</sup> <sup>m</sup> 22 35	+ 10° 13'	<sup>h</sup> <sup>m</sup> 22 45	+ 65° 35'	<sup>h</sup> <sup>m</sup> 22 46	- 8° 11'
Jan. 0.2	14.63 -79	83.0 -1.6	43.22 -09	59.1 -1.3	35.13 -40	64.4 -1.5	36.38 -09	28.2 -0.6
10.1	13.95 .63	81.2 2.1	43.13 .07	57.9 1.2	34.74 .36	62.6 2.0	36.30 .07	28.7 0.5
20.1	13.37 .52	78.8 2.5	43.07 .05	56.7 1.2	34.41 .30	60.3 2.4	36.24 .05	29.1 0.3
30.1	12.91 .30	76.1 2.9	43.03 -.03	55.5 1.2	34.14 .23	57.7 2.8	36.20 -.03	29.4 -0.2
Feb. 9.1	12.59 .94	73.1 3.1	43.02 .00	54.3 1.1	33.95 .15	54.8 3.0	36.18 .00	29.5 0.0
19.0	12.42 -.09	69.8 -3.2	43.04 +.03	53.3 -1.0	33.85 -.06	51.7 -3.1	36.20 +.03	29.5 +0.1
Mar. 1.0	12.42 +.06	66.6 3.2	43.09 .07	52.4 0.8	33.84 +.04	48.6 0.1	36.24 .06	29.2 0.4
11.0	12.58 .94	63.4 3.1	43.17 .10	51.7 0.5	33.92 .13	45.5 3.0	36.32 .09	28.8 0.6
20.9	12.90 .30	60.4 2.8	43.29 .14	51.3 -0.2	34.10 .23	42.7 2.7	36.43 .13	28.1 0.8
30.9	13.38 .54	57.8 2.4	43.44 .17	51.2 +0.1	34.37 .32	40.1 2.3	36.57 .16	27.1 1.0
Apr. 9.9	13.98 +.06	55.5 -2.0	43.64 +.21	51.4 +0.4	34.73 +.40	38.0 -1.9	36.75 +.20	26.0 +1.3
19.9	14.70 .77	53.8 1.5	43.86 .94	52.0 0.7	35.16 .46	36.3 1.4	36.97 .23	24.6 1.5
29.8	15.51 .84	52.0 0.8	44.11 .26	52.9 1.1	35.06 .52	35.2 0.8	37.21 .25	23.1 1.6
May 9.8	16.39 .80	52.0 -0.3	44.38 .26	54.1 1.4	36.20 .56	34.7 -0.2	37.47 .28	21.4 1.8
19.8	17.30 .91	52.0 +0.3	44.67 .30	55.6 1.6	36.78 .58	34.7 +0.3	37.76 .29	19.6 1.8
29.8	18.22 +.91	52.6 +0.9	44.97 +.30	57.3 +1.8	37.37 +.59	35.4 +0.9	38.06 +.30	17.7 +1.9
June 8.7	19.12 .88	53.8 1.5	45.28 .30	59.2 2.0	37.95 .58	36.6 1.5	38.37 .31	15.8 1.9
18.7	19.97 .89	55.5 2.0	45.58 .29	61.3 2.1	38.52 .55	38.3 2.0	38.67 .30	13.9 1.8
28.7	20.75 .74	57.8 2.4	45.87 .28	63.4 2.2	39.05 .51	40.5 2.4	38.97 .29	12.2 1.7
July 8.6	21.46 .84	60.4 2.8	46.13 .25	65.6 2.2	39.53 .45	43.1 2.8	39.25 .26	10.5 1.6
18.6	22.04 +.20	63.4 +2.2	46.37 +.22	67.7 +2.1	39.95 +.20	46.1 +3.1	39.50 +.24	9.1 +1.4
28.6	22.51 .40	66.8 3.4	46.58 .19	69.8 2.0	40.30 .31	49.4 3.3	39.72 .20	7.8 1.1
Aug. 7.6	22.84 .27	70.3 3.6	46.74 .15	71.7 1.8	40.58 .23	52.8 3.5	39.90 .16	6.8 0.9
17.5	23.04 +.13	73.9 3.7	46.87 .10	73.5 1.7	40.76 .15	56.4 3.6	40.04 .12	6.0 0.6
27.5	23.11 .00	77.6 3.7	46.95 .06	75.0 1.5	40.87 +.06	60.0 3.6	40.14 .08	5.5 0.4
Sept. 6.5	23.04 -14	81.3 +3.6	46.99 +.02	76.4 +1.2	40.89 -.02	63.6 +3.5	40.20 +.04	5.2 +0.2
16.5	22.83 .27	84.9 3.5	46.99 -.02	77.5 1.0	40.82 .10	67.1 3.4	40.21 .00	5.2 -0.1
26.4	22.50 .20	88.3 3.3	46.96 .05	78.4 0.8	40.68 .18	70.4 3.2	40.19 -.04	5.3 0.3
Oct. 6.4	22.05 .50	91.5 3.0	46.89 .08	79.0 0.5	40.47 .25	73.5 2.9	40.13 .07	5.7 0.4
16.4	21.49 .80	94.3 2.7	46.80 .10	79.4 0.3	40.19 .31	76.2 2.5	40.05 .10	6.2 0.6
26.3	20.84 -.09	96.8 +2.2	46.68 -.12	79.6 +0.1	39.85 -.26	78.5 +2.1	39.94 -.11	6.8 -0.6
Nov. 5.3	20.12 .76	98.8 1.7	46.55 .14	79.5 -0.2	39.47 .40	80.5 1.7	39.82 .12	7.5 0.7
15.3	19.33 .80	100.3 1.2	46.42 .14	79.3 0.4	39.05 .43	81.9 1.1	39.69 .13	8.2 0.7
25.3	18.51 .83	101.2 +0.6	46.28 .13	78.8 0.6	38.60 .45	82.7 +0.6	39.56 .13	8.9 0.7
Dec. 5.2	17.67 .83	101.5 0.0	46.15 .13	78.1 0.8	38.15 -.46	83.0 0.0	39.43 .12	9.7 0.7
15.2	16.84 -.81	101.1 -0.6	46.03 -.12	77.3 -0.9	37.69 -.45	82.7 -0.6	39.31 -.11	10.4 -0.7
25.2	16.05 .77	100.2 1.2	45.91 .10	76.3 1.1	37.25 .43	81.8 1.2	39.20 .10	11.0 0.6
35.2	15.31 -.71	98.7 -1.8	45.82 -.08	75.1 -1.1	36.84 -.39	80.4 -1.7	39.11 -.08	11.6 -0.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Piscis Australis. (Fomalhaut.)		$\alpha$ Pegasi. (Markab.)		$\epsilon$ Cephei.		$\theta$ Piscium.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 22 51	<sup>°</sup> <sup>'</sup> -30 13	<sup>h</sup> <sup>m</sup> 22 59	<sup>°</sup> <sup>'</sup> +14 35	<sup>h</sup> <sup>m</sup> 23 13	<sup>°</sup> <sup>'</sup> +67 28	<sup>h</sup> <sup>m</sup> 23 22	<sup>°</sup> <sup>'</sup> + 5 44
Jan. 0.2	16.81 -12	59.6 +0.3	1.74 -11	19.0 -1.1	54.85 -46	77.1 -1.9	7.90 -1.1	53.6 -0.9
10.2	16.70 .09	59.2 0.5	1.64 .09	17.8 1.2	54.40 .43	75.7 1.7	7.79 .10	52.7 0.9
20.1	16.63 .06	58.6 0.7	1.56 .07	16.5 1.3	54.00 .37	73.8 2.1	7.70 .08	51.8 0.9
30.1	16.57 .04	57.7 1.0	1.50 .05	15.2 1.3	53.66 .31	71.4 2.5	7.63 .06	50.9 0.9
Feb. 9.1	16.55 -01	56.6 1.3	1.46 -02	13.8 1.3	53.39 .23	68.7 2.8	7.58 .04	50.0 0.8
19.0	16.56 +03	55.2 +1.5	1.45 +01	12.6 -1.2	53.21 -1.3	65.8 -3.0	7.56 -0.1	49.3 -0.6
Mar. 1.0	16.60 .06	53.6 1.7	1.48 .04	11.5 1.0	53.12 -0.4	62.7 3.1	7.56 +0.2	48.7 0.5
11.0	16.68 .10	51.9 1.9	1.54 .08	10.6 0.8	53.14 +0.7	59.6 3.0	7.60 .05	48.4 -0.3
20.9	16.80 .14	49.9 2.0	1.64 .12	9.9 0.5	53.26 .18	56.6 2.8	7.67 .09	48.2 0.0
30.9	16.96 .18	47.9 2.1	1.77 .15	9.5 -0.2	53.49 .28	53.9 2.5	7.78 .13	48.3 +0.3
Apr. 9.9	17.15 +21	45.7 +2.2	1.94 +19	9.5 +0.1	53.81 +3.7	51.5 -2.2	7.93 +1.7	48.7 +0.6
19.9	17.38 .25	43.5 2.2	2.15 .22	9.8 0.5	54.22 .45	49.6 1.7	8.11 .20	49.5 0.8
29.8	17.64 .28	41.3 2.2	2.39 .25	10.5 0.8	54.72 .52	48.1 1.2	8.33 .23	50.4 1.1
May 9.8	17.94 .30	39.1 2.1	2.65 .28	11.5 1.2	55.27 .58	47.2 -0.6	8.58 .26	51.7 1.4
19.8	18.25 .33	37.0 2.0	2.94 .30	12.8 1.5	55.87 .61	46.9 0.0	8.85 .28	53.2 1.6
29.8	18.59 +34	35.0 +1.8	3.24 +31	14.4 +1.7	56.49 +6.3	47.2 +0.5	9.14 +3.0	54.9 +1.8
June 8.7	18.93 .34	33.3 1.6	3.56 .31	16.3 1.9	57.13 .63	48.0 1.1	9.44 .30	56.8 1.9
18.7	19.27 .34	31.8 1.4	3.86 .30	18.3 2.1	57.75 .61	49.3 1.6	9.75 .30	58.8 2.0
28.7	19.60 .32	30.6 1.1	4.16 .29	20.4 2.2	58.35 .58	51.2 2.1	10.05 .29	60.8 2.0
July 8.7	19.91 .30	29.7 0.7	4.44 .27	22.7 2.2	58.91 .53	53.5 2.5	10.33 .28	62.9 2.0
18.6	20.20 +27	29.1 +0.4	4.70 +24	24.9 +2.2	59.41 +4.7	56.3 +2.8	10.60 +2.5	64.8 +1.9
28.6	20.45 .23	28.9 +0.1	4.92 .21	27.1 2.2	59.84 .29	59.3 3.2	10.84 .22	66.7 1.8
Aug. 7.6	20.66 .19	29.0 -0.3	5.11 .17	29.3 2.1	60.20 .31	62.6 3.4	11.04 .19	68.4 1.6
17.6	20.83 .14	29.5 0.6	5.25 .13	31.2 1.9	60.47 .23	66.1 3.5	11.21 .15	70.0 1.4
27.5	20.95 .09	30.2 0.9	5.36 .08	33.1 1.7	60.66 .14	69.7 3.6	11.34 .11	71.4 1.2
Sept. 6.5	21.02 +05	31.3 -1.1	5.42 +04	34.7 +1.5	60.75 +0.5	73.3 +3.8	11.43 +0.6	72.5 +1.0
16.5	21.04 .00	32.5 1.3	5.45 .00	36.1 1.3	60.76 -0.4	76.9 3.5	11.48 +0.3	73.4 0.8
26.4	21.02 -05	33.8 1.4	5.43 -03	37.2 1.0	60.68 .12	80.4 3.4	11.49 -0.1	74.0 0.6
Oct. 6.4	20.95 .08	35.3 1.5	5.38 .06	38.1 0.8	60.52 .20	83.6 3.1	11.47 .04	74.5 0.3
16.4	20.85 .11	36.8 1.5	5.31 .09	38.8 0.5	60.29 .27	86.6 2.8	11.41 .07	74.7 +0.1
26.4	20.72 -14	38.2 -1.4	5.21 -11	39.2 +0.3	59.99 -3.3	89.3 +2.5	11.34 -0.9	74.7 -0.1
Nov. 5.3	20.58 .15	39.5 1.2	5.09 .12	39.4 0.0	59.62 .39	91.6 2.0	11.24 .10	74.5 0.2
15.3	20.42 .16	40.7 1.0	4.96 .13	39.3 -0.2	59.21 .43	93.4 1.5	11.13 .11	74.2 0.4
25.3	20.26 .16	41.6 0.8	4.83 .13	38.9 0.4	58.76 .47	94.7 1.0	11.01 .12	73.7 0.6
Dec. 5.3	20.10 .15	42.3 0.6	4.70 .13	38.4 0.7	58.28 .48	95.4 +0.4	10.89 .12	73.1 0.7
15.2	19.95 -14	42.8 -0.3	4.57 -13	37.7 -0.9	57.79 -4.9	95.5 -0.2	10.77 -1.2	72.4 -0.8
25.2	19.82 .13	42.9 0.0	4.44 .12	36.7 1.0	57.30 .48	95.1 0.8	10.65 .12	71.5 0.9
35.2	19.70 -11	42.8 +0.3	4.33 -10	35.6 -1.2	56.83 -4.6	94.0 -1.3	10.54 -1.1	70.6 -0.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Piscium.		γ Cephei.		Groombridge 4163.		♋ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 23 <sup>m</sup> 34	+ 5° 0'	<sup>h</sup> 23 <sup>m</sup> 34	+ 76° 59'	<sup>h</sup> 23 <sup>m</sup> 49	+ 73° 46'	<sup>h</sup> 23 <sup>m</sup> 53	+ 6° 13'
Jan. 0.2	<sup>s</sup> 2.01 -11	13.6 -0.6	<sup>s</sup> 39.16 -87	46.8 -0.6	<sup>s</sup> 16.25 -69	33.8 -0.5	<sup>s</sup> 24.39 -11	38.1 -0.8
10.2	1.91 .10	12.8 0.9	38.30 .83	45.8 1.3	15.57 .66	32.9 1.1	24.27 .11	37.2 0.9
20.2	1.81 .09	11.9 0.9	37.51 .75	44.2 1.8	14.93 .61	31.5 1.7	24.17 .10	36.4 0.9
30.1	1.74 .07	11.0 0.8	36.80 .64	42.2 2.3	14.35 .53	29.6 2.2	24.08 .08	35.5 0.8
Feb. 9.1	1.68 .05	10.2 0.7	36.22 .51	39.6 2.7	13.87 .43	27.2 2.6	24.00 .06	34.7 0.8
19.1	1.64 -0.2	9.5 -0.6	35.78 -36	36.8 -3.0	13.49 -32	24.4 -2.9	23.95 -0.4	34.0 -0.6
Mar. 1.1	1.63 +0.1	9.0 0.4	35.51 .19	33.7 3.1	13.23 .18	21.4 3.1	23.92 -0.1	33.4 0.5
11.0	1.66 .04	8.7 -0.3	35.41 -0.1	30.5 3.2	13.12 -0.4	18.3 3.1	23.93 +0.2	33.0 -0.3
21.0	1.72 .07	8.6 0.0	35.50 +1.8	27.4 3.1	13.15 +1.0	15.2 3.0	23.97 .06	32.9 0.0
30.9	1.80 .12	8.7 +0.3	35.77 .36	24.4 2.9	13.33 .36	12.2 2.9	24.05 .10	33.0 +0.2
Apr. 9.9	1.95 +1.7	9.2 +0.6	36.21 +5.2	21.6 -2.5	13.65 +3.2	9.5 -2.6	24.16 +1.4	33.3 +0.5
19.9	2.13 .19	9.9 0.9	36.81 .67	19.3 2.1	14.10 .51	7.1 2.2	24.32 .18	34.0 0.8
29.9	2.34 .23	10.9 1.1	37.55 .79	17.4 1.6	14.67 .62	5.1 1.7	24.52 .21	34.9 1.1
May 9.9	2.58 .26	12.2 1.4	38.39 .89	16.0 1.1	15.34 .71	3.7 1.2	24.75 .24	36.1 1.3
19.8	2.85 .28	13.6 1.6	39.33 .96	15.2 -0.5	16.09 .78	2.7 0.6	25.00 .27	37.5 1.5
29.8	3.14 +3.0	15.4 +1.8	40.32 1.00	14.9 0.0	16.90 +0.2	2.4 -0.1	25.29 +2.2	39.1 +1.7
June 8.8	3.44 .30	17.2 1.9	41.34 1.01	15.2 +0.6	17.73 .84	2.6 +0.5	25.59 .30	41.0 1.9
18.7	3.75 .31	19.2 2.0	42.35 1.00	16.1 1.2	18.58 .83	3.4 1.1	25.89 .31	42.9 2.0
28.7	4.05 .30	21.2 2.0	43.33 .96	17.6 1.7	19.40 .81	4.7 1.6	26.20 .30	44.9 2.0
July 8.7	4.35 .28	23.2 2.0	44.25 .88	19.6 2.2	20.19 .76	6.5 2.1	26.49 .29	46.9 2.0
18.7	4.62 +2.8	25.1 +1.9	45.10 +7.9	22.0 +2.6	20.92 +0.9	8.8 +2.5	26.78 +2.7	48.9 +1.9
28.6	4.86 .23	27.0 1.8	45.84 .68	24.8 3.0	21.57 .61	11.5 2.9	27.03 .24	50.8 1.8
Aug. 7.6	5.08 .20	28.7 1.6	46.46 .56	27.9 3.3	22.13 .51	14.5 3.2	27.26 .21	52.5 1.7
17.6	5.26 .16	30.2 1.4	46.96 .43	31.3 3.5	22.60 .41	17.8 3.4	27.46 .18	54.1 1.5
27.6	5.40 .12	31.5 1.2	47.32 .29	34.9 3.6	22.96 .30	21.3 3.6	27.61 .14	55.5 1.3
Sept. 6.5	5.50 +0.8	32.6 +1.0	47.54 +1.5	38.5 +3.7	23.20 +1.9	24.9 +3.7	27.73 +1.0	56.7 +1.1
16.5	5.56 .04	33.4 0.7	47.62 .00	42.3 3.7	23.33 +0.7	28.6 3.7	27.81 .06	57.6 0.8
26.5	5.59 +0.1	34.0 0.5	47.55 -1.4	46.0 3.6	23.34 -0.5	32.3 3.6	27.86 +0.3	58.3 0.6
Oct. 6.4	5.58 -0.3	34.4 0.3	47.34 .29	49.5 3.5	23.24 .16	35.8 3.5	27.87 -0.1	58.8 0.4
16.4	5.53 .05	34.6 +0.1	47.00 .41	52.9 3.2	23.03 .26	39.2 3.2	27.84 .04	59.0 +0.2
26.4	5.47 -0.8	34.6 -0.1	46.53 -5.3	56.0 +2.9	22.71 -3.7	42.3 +2.9	27.79 -0.6	59.1 0.0
Nov. 5.4	5.38 .09	34.3 0.3	45.93 .64	58.7 2.5	22.30 .46	45.1 2.6	27.72 .08	58.9 -0.2
15.3	5.28 .11	34.0 0.4	45.24 .73	61.0 2.1	21.79 .54	47.5 2.1	27.63 .10	58.6 0.4
25.3	5.17 .19	33.5 0.6	44.47 .81	62.8 1.5	21.22 .61	49.3 1.6	27.53 .11	58.2 0.5
Dec. 5.3	5.05 .12	32.8 0.7	43.62 .86	64.1 1.0	20.57 .66	50.7 1.1	27.41 .12	57.6 0.6
15.3	4.93 -1.1	32.1 -0.8	42.74 -8.9	64.8 +0.3	19.91 -6.8	51.5 +0.5	27.30 -1.2	56.9 -0.7
25.2	4.81 .11	31.3 0.8	41.84 .89	64.8 -0.2	19.21 .70	51.6 -0.2	27.18 .12	56.2 0.8
35.2	4.70 -1.1	30.4 -0.9	40.95 -8.8	64.3 -0.5	18.51 -6.8	51.2 -0.8	27.06 -1.2	55.3 -0.8

APPARENT RIGHT ASCENSIONS AND APPROXIMATE NORTH POLAR DISTANCES  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Cass.	$\alpha$ Androm.	$\sigma$ Androm.	$\iota$ Ceti.	6 Urs. Min., S. P.	44 Piscium.	$\pi$ Androm.	$\circ$ Cass.
	$31^{\circ} 29'$ h m 0 3	$44^{\circ} 34'$ h m 0 4	$53^{\circ} 51'$ h m 0 12	$99^{\circ} 28'$ h m 0 13	$358^{\circ} 20'$ h m 0 13	$88^{\circ} 42'$ h m 0 19	$56^{\circ} 55'$ h m 0 30	$42^{\circ} 21'$ h m 0 38
Aug. 26.6	$7.90 + .23$	$24.98 + .19$	$23.13 + .19$	$36.94 + .17$	$22.16 - 3.16$	$33.53 + .17$	$48.08 + .90$	$23.46 + .25$
Sept. 5.5	$8.10 .17$	$25.14 .14$	$23.29 .14$	$37.08 .14$	$19.26 2.44$	$33.67 .14$	$48.26 .16$	$23.68 .20$
15.5	$8.23 .10$	$25.25 .09$	$23.41 .10$	$37.19 .10$	$17.28 - 1.22$	$33.79 .10$	$48.40 .19$	$23.85 .15$
25.5	$8.30 + .04$	$25.32 + .04$	$23.47 .06$	$37.26 .06$	$16.81 + .10$	$33.86 .06$	$48.49 .08$	$23.96 .10$
Oct. 5.5	$8.31 - .03$	$25.33 - .02$	$23.50 + .02$	$37.30 + .02$	$17.49 1.01$	$33.90 + .03$	$48.55 .05$	$24.03 .06$
15.4	$8.25 - .08$	$25.30 - .05$	$23.50 - .02$	$37.29 - .01$	$18.83 + 1.94$	$33.91 .00$	$48.57 + .01$	$24.06 + .01$
25.4	$8.15 .13$	$25.24 .08$	$23.46 .06$	$37.26 .03$	$21.38 3.32$	$33.89 - .03$	$48.55 - .02$	$24.03 - .03$
Nov. 4.4	$7.99 .18$	$25.14 .12$	$23.39 .09$	$37.21 .06$	$25.46 4.46$	$33.84 .05$	$48.51 .05$	$23.97 .07$
14.4	$7.79 .22$	$25.00 .15$	$23.28 .12$	$37.13 .08$	$30.30 5.15$	$33.77 .07$	$48.43 .08$	$23.87 .11$
24.3	$7.54 .26$	$24.84 .17$	$23.15 .14$	$37.03 .09$	$35.76 5.98$	$33.68 .09$	$48.33 .10$	$23.74 .14$
Dec. 4.3	$7.28 - .29$	$24.66 - .20$	$23.01 - .15$	$36.92 - .10$	$42.26 + 6.98$	$33.58 - .10$	$48.21 - .12$	$23.57 - .17$
14.3	$6.97 .32$	$24.45 .21$	$22.85 .17$	$36.81 .11$	$49.71 7.51$	$33.47 .11$	$48.07 .14$	$23.39 .19$
24.2	$6.65 .33$	$24.24 .21$	$22.68 .17$	$36.68 .11$	$57.28 7.54$	$33.36 .11$	$47.92 .15$	$23.18 .21$
34.2	$6.32 - .34$	$24.02 - .20$	$22.50 - .16$	$36.57 - .11$	$64.79 + 7.10$	$33.24 - .10$	$47.74 - .15$	$22.95 - .22$
Mean Solar Date.	$\delta$ Piscium.	$\gamma$ Cass.	$\mu$ Androm.	43 Cephei.	$f$ Piscium.	$\kappa$ Tucanae.	$\kappa$ Octantis, S. P.	$\nu$ Androm.
	$83^{\circ} 3'$ h m 0 42	$29^{\circ} 55'$ h m 0 49	$52^{\circ} 8'$ h m 0 50	$4^{\circ} 22'$ h m 0 53	$87^{\circ} 0'$ h m 1 11	$159^{\circ} 29'$ h m 1 11	$184^{\circ} 48'$ h m 1 22	$49^{\circ} 10'$ h m 1 30
(Dec. 30.3)	. . .	. . .	. . .	$22.32 - 2.25$	$52.47 - .13$	$51.19 - .56$	$35.92 + 2.75$	$4.20 - .16$
Jan. 9.2	. . .	. . .	. . .	$19.42 2.86$	$52.34 .13$	$50.63 .55$	$38.70 2.80$	$4.02 .17$
19.2	. . .	. . .	. . .	$16.62 2.67$	$52.21 .13$	$50.08 .53$	$41.52 2.82$	$3.82 .18$
29.2	. . .	. . .	. . .	$14.09 - 2.52$	$52.08 - .12$	$49.56 - .50$	$44.33 + 2.68$	$3.59 - .19$
Aug. 26.6	$46.03 + .20$	$51.66 + .22$	$26.13 + .23$	$36.99 + 1.78$				
Sept. 5.6	$46.21 .16$	$51.98 .27$	$26.34 .19$	$38.72 1.51$	$55.12 + .19$	$54.76 + .39$	$31.87 - 1.31$	$7.09 + .25$
15.5	$46.34 .12$	$52.21 .18$	$26.50 .15$	$40.07 1.01$	$55.29 .15$	$55.10 .29$	$30.60 1.13$	$7.31 .20$
25.5	$46.44 .09$	$52.35 .12$	$26.62 .11$	$40.83 .55$	$55.41 .12$	$55.34 .21$	$29.54 .71$	$7.48 .15$
Oct. 5.5	$46.50 .05$	$52.46 + .08$	$26.71 .07$	$41.25 + .24$	$55.51 .08$	$55.50 .12$	$29.08 - .12$	$7.62 .12$
15.5	$46.54 + .02$	$52.52 .00$	$26.75 + .03$	$41.39 - .16$	$55.57 + .05$	$55.57 + .02$	$29.20 + .37$	$7.72 + .06$
25.4	$46.54 - .01$	$52.49 - .07$	$26.76 .00$	$41.02 .71$	$55.60 + .02$	$55.55 - .06$	$29.74 .79$	$7.78 + .04$
Nov. 4.4	$46.51 .03$	$52.39 .12$	$26.73 - .04$	$40.09 1.26$	$55.60 .00$	$55.44 .16$	$30.68 1.30$	$7.81 .00$
14.4	$46.47 .05$	$52.26 .16$	$26.67 .07$	$38.60 1.45$	$55.57 - .03$	$55.22 .25$	$32.22 1.80$	$7.78 - .04$
24.4	$46.40 .07$	$52.09 .22$	$26.58 .10$	$37.26 1.73$	$55.52 .05$	$54.91 .34$	$34.17 2.15$	$7.73 .07$
Dec. 4.3	$46.31 - .09$	$51.83 - .22$	$26.46 - .12$	$35.23 - 2.30$	$55.45 - .07$	$54.52 - .42$	$36.42 + 2.37$	$7.64 - .10$
14.3	$46.21 .10$	$51.54 .29$	$26.32 .14$	$32.77 2.50$	$55.37 .09$	$54.07 .49$	$38.83 2.65$	$7.53 .13$
24.3	$46.09 .11$	$51.26 .30$	$26.16 .16$	$30.28 2.58$	$55.26 .10$	$53.53 .54$	$41.66 2.93$	$7.38 .15$
34.2	$45.97 - .12$	$50.93 - .33$	$25.96 - .17$	$27.66 - 2.70$	$55.15 - .11$	$52.97 - .57$	$44.64 + 3.00$	$7.22 - .17$

APPARENT RIGHT ASCENSIONS AND APPROXIMATE NORTH POLAR DISTANCES FOR THE UPPER TRANSIT AT WASHINGTON.								
Mean Solar Date.	$\pi$ Piscium.	$\nu$ Piscium.	$\zeta$ Ceti.	$\gamma$ Androm.	$\beta$ Trianguli.	$\delta$ Urs. Min., S. P.	$\gamma$ Trianguli.	$\delta$ Ceti.
	$78^{\circ} 27'$ h m 1 31	$85^{\circ} 6'$ h m 1 35	$100^{\circ} 54'$ h m 1 45	$48^{\circ} 14'$ h m 1 56	$55^{\circ} 34'$ h m 2 2	$348^{\circ} 5'$ h m 2 9	$56^{\circ} 41'$ h m 2 10	$96^{\circ} 57'$ h m 2 11
(Dec. 30.3)	$0.82 - .12$	$27.42 - .10$	$47.54 - .12$	$51.94 - .16$	$43.40 - .15$	$13.40 + 1.05$	$30.01 - .14$	$15.49 - .11$
Jan. 9.3	$0.69 .13$	$27.30 .12$	$47.41 .13$	$51.76 .18$	$43.25 .15$	$14.48 1.11$	$29.87 .15$	$15.38 .12$
19.2	$0.56 .14$	$27.17 .13$	$47.28 .14$	$51.57 .20$	$43.08 .16$	$15.61 1.12$	$29.70 .17$	$15.25 .14$
29.2	$0.40 - .14$	$27.03 - .14$	$47.13 - .15$	$51.36 - .22$	$42.90 .18$	$16.72 1.10$	$29.52 .18$	$15.10 .15$
Feb. 8.2	. . .	. . .	. . .	. . .	$42.71 .18$	$17.82 1.10$	$29.34 .19$	$14.95 .15$
18.2	. . .	. . .	. . .	. . .	$42.53 - .18$	$18.93 + 1.03$	$29.14 - .20$	$14.80 - .15$
Sept. 5.6	$3.35 + .19$	$29.89 + .20$	$49.82 + .20$	$54.60 + .28$				
15.6	$3.53 .16$	$30.07 .16$	$50.00 .17$	$54.86 .24$				
25.6	$3.68 .13$	$30.22 .13$	$50.16 .14$	$55.08 .20$	$46.34 + .18$	$10.77 - .53$	$32.86 + .20$	$17.95 + .16$
Oct. 5.5	$3.80 + .10$	$30.33 + .10$	$50.29 + .11$	$55.26 + .16$	$46.51 + .15$	$10.30 - .40$	$33.04 + .16$	$18.10 + .13$
15.5	$3.88 .06$	$30.42 .07$	$50.38 .08$	$55.40 .11$	$46.65 .12$	$9.94 .26$	$33.19 .12$	$18.21 .10$
25.5	$3.93 .03$	$30.47 .04$	$50.45 .05$	$55.49 .07$	$46.75 .08$	$9.75 - .05$	$33.29 .08$	$18.30 .07$
Nov. 4.5	$3.95 + .01$	$30.50 + .01$	$50.48 + .01$	$55.55 + .04$	$46.82 .05$	$9.81 + .14$	$33.36 .06$	$18.36 .04$
14.4	$3.95 - .02$	$30.50 - .01$	$50.48 - .01$	$55.57 .00$	$46.85 + .01$	$10.00 .29$	$33.41 + .02$	$18.38 + .01$
24.4	$3.91 - .04$	$30.47 - .04$	$50.45 - .04$	$55.56 - .04$	$46.84 - .03$	$10.35 + .48$	$33.41 - .02$	$18.38 - .01$
Dec. 4.4	$3.86 .06$	$30.41 .06$	$50.40 .06$	$55.49 .08$	$46.79 .06$	$10.91 .68$	$33.37 .05$	$18.35 .04$
14.3	$3.78 .09$	$30.34 .06$	$50.33 .08$	$55.40 .11$	$46.72 .06$	$11.67 .84$	$33.31 .08$	$18.29 .07$
24.3	$3.68 .10$	$30.24 .10$	$50.23 .11$	$55.27 .14$	$46.62 .12$	$12.54 .93$	$33.21 .11$	$18.20 .09$
34.3	$3.57 - .11$	$30.13 - .12$	$50.11 - .14$	$55.11 - .17$	$46.48 - .16$	$13.50 + 1.00$	$33.08 - .14$	$18.10 - .11$
Mean Solar Date.	$\delta$ Hydri.	$\delta$ Ceti.	$\mu$ Hydri.	$\theta$ Persei.	$\sigma$ Arietis.	$\delta$ Cephei.	$\epsilon$ Arietis.	$\beta$ Persei.
	$159^{\circ} 11'$ h m 2 19	$90^{\circ} 10'$ h m 2 33	$169^{\circ} 37'$ h m 2 34	$41^{\circ} 16'$ h m 2 36	$75^{\circ} 24'$ h m 2 45	$11^{\circ} 2'$ h m 2 50	$69^{\circ} 7'$ h m 2 52	$49^{\circ} 29'$ h m 3 0
(Dec. 30.4)	$42.66 - .55$	$36.18 - .09$	$8.57 - 1.10$	$22.81 - .18$	$9.74 - .09$	$57.16 - .66$	$39.45 - .08$	$42.99 - .11$
Jan. 9.3	$42.12 .56$	$36.07 .11$	$7.43 1.18$	$22.63 .20$	$9.64 .11$	$56.29 .20$	$39.35 .11$	$42.87 .14$
19.3	$41.54 .58$	$35.95 .13$	$6.21 1.26$	$22.41 .23$	$9.51 .13$	$55.37 .24$	$39.22 .14$	$42.70 .19$
29.3	$40.96 .58$	$35.80 .15$	$4.92 1.28$	$22.17 .24$	$9.37 .15$	$54.43 1.02$	$39.07 .15$	$42.49 .21$
Feb. 8.2	$40.38 .57$	$35.65 .15$	$3.67 1.20$	$21.92 .26$	$9.21 .16$	$53.33 1.10$	$38.91 .16$	$42.28 .21$
18.2	$39.81 - .56$	$35.49 - .16$	$2.52 - 1.15$	$21.65 - .26$	$9.05 - .17$	$52.22 - 1.03$	$38.74 - .17$	$42.06 - .22$
28.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	$41.83 - .22$
Sept. 25.6	$44.82 + .36$	$38.48 + .18$	$10.08 + .72$	$25.82 + .27$	$12.09 + .20$	$62.88 + .86$	$41.80 + .22$	
Oct. 5.6	$45.12 .26$	$38.65 .15$	$10.69 .50$	$26.08 .23$	$12.28 .17$	$63.75 .79$	$42.00 .19$	$45.83 + .24$
15.5	$45.32 + .16$	$38.79 + .12$	$11.04 + .28$	$26.29 + .19$	$12.44 + .14$	$64.49 + .61$	$42.18 + .16$	$46.05 + .20$
25.5	$45.43 + .05$	$38.90 .09$	$11.21 + .10$	$26.46 .15$	$12.57 .11$	$64.99 .41$	$42.33 .13$	$46.23 .16$
Nov. 4.5	$45.43 - .05$	$38.98 .07$	$11.17 - .14$	$26.59 .10$	$12.67 .09$	$65.33 .25$	$42.44 .09$	$46.38 .12$
14.5	$45.32 .17$	$39.04 + .04$	$10.87 .40$	$26.66 + .05$	$12.75 .08$	$65.51 + .10$	$42.52 .08$	$46.48 .08$
24.4	$45.08 .26$	$39.06 .00$	$10.34 .59$	$26.70 .00$	$12.79 + .02$	$65.56 - .11$	$42.57 + .03$	$46.55 + .04$
Dec. 4.4	$44.77 - .34$	$39.05 - .03$	$9.65 - .74$	$26.67 - .04$	$12.79 - .01$	$65.34 - .26$	$42.58 .00$	$46.57 .00$
14.4	$44.38 .42$	$39.01 .05$	$8.81 .22$	$26.61 .09$	$12.76 .04$	$64.90 .49$	$42.56 - .03$	$46.55 - .04$
24.4	$43.92 .49$	$38.95 .07$	$7.77 1.10$	$26.48 .14$	$12.71 .07$	$64.39 .61$	$42.51 .06$	$46.48 .09$
34.3	$43.39 - .55$	$38.86 - .09$	$6.56 - 1.26$	$26.33 - .18$	$12.62 - .10$	$63.71 - .78$	$42.43 - .09$	$46.37 - .14$



APPARENT RIGHT ASCENSIONS AND APPROXIMATE NORTH POLAR DISTANCES  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\rho$ Octantis, S. P.	$\epsilon$ Hydri.	$f$ Tauri.	$\gamma$ Camelop.	$\gamma$ Hydri.	$\epsilon$ Persei.	$\Delta^1$ Tauri.	$\epsilon$ Persei.
	185° 55' h m 3 16	167° 48' h m 3 18	77° 28' h m 3 24	19° 2' h m 3 38	164° 35' h m 3 48	50° 19' h m 3 50	68° 14' h m 3 57	42° 36' h m 4 0
(Dec.30.4)	52.53 +2.00	52.74 - .85	32.68 - .06	18.41 - .33	64.29 - .60	10.14 - .07	55.34 - .05	21.09 - .07
Jan. 9.3	54.67 2.25	51.83 .06	32.60 .09	18.05 .40	63.63 .70	10.05 .11	55.28 .08	21.00 .12
19.3	57.04 2.47	50.83 1.04	32.49 .12	17.62 .46	62.88 .78	9.92 .15	55.18 .11	20.85 .17
29.3	59.60 2.48	49.75 1.06	32.35 .14	17.14 .54	62.06 .83	9.74 .19	55.05 .14	20.65 .21
Feb. 8.3	61.99 2.39	48.66 1.09	32.20 .16	16.64 .62	61.20 .87	9.54 .21	54.89 .17	20.42 .24
18.2	64.34 +2.39	47.58 -1.08	32.03 - .17	15.91 - .59	60.30 - .90	9.32 - .23	54.71 - .18	20.17 - .26
28.2	66.81 +2.35	46.52 -1.07	31.86 - .18	15.36 - .57	59.40 - .92	9.08 - .25	54.52 - .19	19.89 .27
Mar. 10.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	19.63 - .28
Oct. 5.6	59.07 -1.02	52.65 + .65	34.91 + .21	22.33 + .61	63.37 + .60	12.57 + .28	57.43 + .25	
15.6	58.19 - .71	53.20 + .46	35.11 + .18	22.91 + .50	63.91 + .48	12.85 + .25	57.67 + .22	23.91 + .26
25.5	57.57 - .39	53.56 .27	35.27 .15	23.35 .40	64.32 .25	13.08 .22	57.88 .19	24.20 .26
Nov. 4.5	57.34 + .08	53.73 + .08	35.41 .13	23.74 .34	64.59 .21	13.29 .18	58.06 .17	24.44 .29
14.5	57.63 .58	53.72 - .11	35.53 .10	24.05 .24	64.72 + .06	13.45 .15	58.22 .14	24.65 .18
24.5	58.41 .24	53.53 .29	35.61 .06	24.25 + .10	64.70 - .08	13.59 .11	58.34 .10	24.80 .13
Dec. 4.4	59.43 +1.24	53.14 - .48	35.65 + .02	24.28 - .04	64.54 - .23	13.67 + .06	58.42 + .06	24.91 + .08
14.4	60.81 1.67	52.57 .66	35.66 .00	24.19 .10	64.22 .38	13.71 + .01	58.47 + .03	24.96 + .02
24.4	62.68 2.05	51.87 .79	35.64 - .04	24.04 .20	63.75 .51	13.69 - .03	58.48 - .01	24.95 - .03
34.4	64.79 +2.25	51.02 - .22	35.58 - .08	23.82 - .34	63.18 - .64	13.64 - .06	58.45 - .04	24.89 - .08
Mean Solar Date.	$\sigma^1$ Eridani.	$\eta$ Urs. Min., S. P.	$m$ Persei.	$\delta$ Mensæ.	$\tau$ Tauri.	$\iota$ Tauri.	$\zeta$ Aurigæ.	$\beta$ Eridani.
	97° 8' h m 4 6	346° 1' h m 4 20	47° 11' h m 4 25	170° 29' h m 4 25	67° 16' h m 4 35	71° 21' h m 4 44	49° 6' h m 4 54	95° 14' h m 5 2
(Dec.30.4)	16.36 - .05	46.70 + .50	21.58 - .03	51.87 - .86	22.19 - .01	40.39 .00	28.48 - .01	13.20 .00
Jan. 9.4	16.30 .08	47.25 .63	21.52 .08	50.89 1.06	22.16 .05	40.37 - .04	28.46 .05	13.18 - .04
19.4	16.20 .11	47.95 .75	21.41 .13	49.74 1.22	22.09 .09	40.31 .08	28.38 .10	13.12 .08
29.3	16.08 .14	48.73 .85	21.25 .17	48.44 1.34	21.97 .13	40.21 .12	28.25 .15	13.02 .11
Feb. 8.3	15.92 .16	49.64 .92	21.06 .21	47.05 1.41	21.82 .16	40.06 .15	28.08 .20	12.89 .14
18.2	15.76 - .17	50.58 + .24	20.92 - .24	45.60 -1.46	21.65 - .18	39.90 - .17	27.86 - .22	12.73 - .17
28.2	15.57 .18	51.52 .23	20.58 .24	44.12 1.47	21.46 .19	39.72 .18	27.63 .23	12.55 .18
Mar. 10.2	15.39 - .19	52.44 + .21	20.34 - .25	42.66 -1.47	21.27 - .20	39.53 - .19	27.39 - .24	12.36 .18
20.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	12.18 - .18
Oct. 15.6	18.25 + .21	46.22 - .72	24.09 + .20	48.02 + .24	24.29 + .26	42.37 + .26	30.72 + .21	
25.6	18.44 .18	45.56 .58	24.38 .27	48.81 .71	24.54 .23	42.61 .23	31.03 .22	14.95 + .23
Nov. 4.6	18.61 .15	45.05 .44	24.64 .24	49.40 .48	24.76 .20	42.84 .21	31.31 .27	15.17 .20
14.5	18.75 .12	44.65 .30	24.86 .20	49.75 + .24	24.95 .17	43.04 .17	31.57 .23	15.35 .17
24.5	18.86 .09	44.41 - .12	25.04 .16	49.87 .00	25.11 .14	43.19 .14	31.79 .19	15.52 .15
Dec. 4.5	18.93 + .05	44.37 + .07	25.18 + .10	49.72 - .28	25.23 + .10	43.32 + .11	31.95 + .14	15.65 + .11
14.4	18.96 + .01	44.50 .24	25.25 .05	49.27 .53	25.31 .06	43.42 .07	32.08 .10	15.74 .07
24.4	18.96 - .02	44.81 .28	25.29 + .01	48.64 .74	25.35 + .02	43.47 + .03	32.15 + .04	15.79 + .03
34.4	18.92 - .05	45.24 + .48	25.27 - .02	47.79 - .22	25.35 - .02	43.48 - .01	32.17 - .01	15.80 - .01

APPARENT RIGHT ASCENSIONS AND APPROXIMATE NORTH POLAR DISTANCES FOR THE UPPER TRANSIT AT WASHINGTON.								
Mean Solar Date.	$\tau$ Orionis.	$\chi$ Aurigæ.	Groom. 944.	$\kappa$ Orionis.	$\nu$ Aurigæ.	$\delta$ Doradus.	$\beta$ Aurigæ.	$\theta$ Aurigæ.
	96° 58' h m 5 12	57° 54' h m 5 25	4° 52' h m 5 25	99° 43' h m 5 42	50° 53' h m 5 43	155° 47' h m 5 44	45° 4' h m 5 51	52° 48' h m 5 51
(Dec. 30.4)	2.79 + .01	16.49 + .04	32.77 - .16	19.63 + .03	33.16 + .05	37.38 - .12	7.79 + .09	54.76 + .08
Jan. 9.4	2.78 - .03	16.51 - .01	32.32 .77	19.65 - .01	33.20 .00	37.20 .22	7.84 + .01	54.81 + .02
19.4	2.73 .07	16.47 .06	31.23 1.23	19.61 .05	33.17 - .05	36.93 .22	7.81 - .06	54.79 - .04
29.4	2.64 .11	16.39 .10	29.87 1.48	19.54 .10	33.09 .10	36.56 .41	7.73 .11	54.72 .09
Feb. 8.3	2.50 .14	16.26 .16	27.94 2.08	19.42 .13	32.97 .15	36.12 .46	7.59 .17	54.61 .14
18.3	2.35 - .16	16.09 - .19	25.73 -2.40	19.27 - .16	32.79 - .20	35.63 - .50	7.40 - .21	54.44 - .19
28.3	2.17 .18	15.89 .19	23.52 2.26	19.10 .18	32.58 .22	35.09 .55	7.17 .24	54.24 .21
Mar. 10.3	1.98 .19	15.68 .22	21.01 2.55	18.91 .19	32.35 .23	34.52 .58	6.92 .26	54.02 .23
20.2	1.79 - .20	15.45 - .23	18.43 -2.46	18.72 - .20	32.11 - .24	33.92 - .60	6.65 - .28	53.79 - .23
Oct. 25.6	4.46 + .24	18.69 + .30	40.75 +2.22	21.08 + .26	35.36 + .22	36.18 + .47	10.04 + .28	56.87 + .24
Nov. 4.6	4.68 .21	18.97 .27	43.09 2.21	21.32 .23	35.68 .20	36.62 .40	10.40 .24	57.19 .21
14.6	4.88 .18	19.23 .24	45.20 1.90	21.54 .21	35.97 .28	36.99 .22	10.72 .21	57.48 .28
24.5	5.05 .15	19.46 .21	46.95 1.42	21.75 .18	36.24 .25	37.26 .22	11.01 .27	57.74 .25
Dec. 4.5	5.19 .11	19.65 .17	48.14 .23	21.91 .14	36.47 .20	37.45 .14	11.26 .23	57.98 .21
14.5	5.28 + .07	19.80 + .12	48.58 + .56	22.04 + .10	36.64 + .15	37.54 + .04	11.47 + .18	58.16 + .16
24.5	5.34 .04	19.90 .08	49.34 + .09	22.12 .06	36.77 .10	37.53 - .06	11.61 .12	58.30 .12
34.4	5.36 + .01	19.96 + .04	49.17 - .50	22.16 + .02	36.85 + .05	37.41 - .16	11.70 + .06	58.39 + .07
Mean Solar Date.	$\gamma$ Geminor.	$\psi$ Aurigæ.	$\nu$ Geminor.	$\chi$ Draconis, S. P.	$\epsilon$ Geminor.	$\phi$ Aurigæ.	$\theta$ Geminor.	$\zeta$ Mensæ.
	67° 28' h m 6 7	40° 39' h m 6 16	69° 43' h m 6 22	342° 41' h m 6 23	64° 45' h m 6 36	46° 19' h m 6 38	55° 54' h m 6 45	170° 41' h m 6 49
(Dec. 30.5)	57.88 + .09	4.80 + .14	9.73 + .10	3.30 + .02	53.07 + .12	28.99 + .15	14.37 + .14	44.92 - .13
Jan. 9.5	57.94 + .04	4.89 + .05	9.80 + .05	3.40 .18	53.16 .07	29.10 + .07	14.48 .09	44.66 .28
19.4	57.95 - .02	4.89 - .03	9.82 - .01	3.65 .31	53.20 + .01	29.13 .00	14.54 + .03	44.15 .64
29.4	57.90 .07	4.83 .10	9.79 .05	4.02 .44	53.19 - .04	29.11 - .06	14.53 - .04	43.39 .86
Feb. 8.4	57.81 .11	4.70 .15	9.72 .10	4.51 .54	53.12 .09	29.02 .12	14.46 .09	42.43 1.06
18.3	57.68 - .15	4.53 - .21	9.59 - .14	5.09 + .62	53.00 - .13	28.88 - .17	14.35 - .14	41.27 -1.23
28.3	57.52 .17	4.29 .26	9.44 .17	5.76 .70	52.86 .16	28.68 .21	14.18 .18	39.98 1.35
Mar. 10.3	57.34 .19	4.02 .28	9.26 .19	6.49 .76	52.68 .19	28.47 .23	13.98 .21	38.57 1.45
20.3	57.14 .20	3.73 .29	9.07 .19	7.26 .78	52.49 .20	28.22 .25	13.77 .22	37.09 1.50
30.2	56.95 .20	3.44 .29	8.88 .19	8.03 .76	52.29 .20	27.96 .26	13.56 .22	35.57 1.52
Apr. 9.2	56.75 - .20	3.16 - .28	8.69 - .18	8.79 + .74	52.09 - .19	27.71 - .25	13.32 - .23	34.06 -1.50
Nov. 14.6	60.25 + .23	7.72 + .28	11.97 + .28	3.69 - .56	55.34 + .20	31.59 + .26	16.77 + .23	38.48 +1.00
24.6	60.48 .23	8.07 .22	12.23 .24	3.17 .44	55.62 .26	31.93 .22	17.08 .29	39.37 .78
Dec. 4.6	60.70 .21	8.36 .27	12.45 .21	2.77 .22	55.86 .23	32.23 .28	17.35 .26	40.03 .55
14.5	60.88 + .16	8.61 + .22	12.64 + .18	2.50 - .18	56.08 + .20	32.49 + .24	17.59 + .22	40.47 + .20
24.5	61.01 .11	8.80 .16	12.80 .13	2.38 - .06	56.25 .15	32.70 .18	17.79 .17	40.62 + .02
34.5	61.09 + .06	8.93 + .10	12.90 + .07	2.36 + .06	56.38 + .11	32.85 + .12	17.93 + .11	40.52 - .22

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Mean Solar Date.	ζ Geminor.	63 Aurigæ.	25 Camelop.	γ <sup>s</sup> Volantis.	β Canis Minoris.	26 Lynceis.	Groom. 1374.	ω <sup>1</sup> Cancri.
	69° 16' h m 6 57	50° 30' h m 7 3	7° 22' h m 7 6	160° 19' h m 7 9	81° 29' h m 7 20	42° 8' h m 7 46	15° 47' h m 7 46	64° 18' h m 7 53
(Dec.30.5)	18.93 + .11	46.56 + .16	59.71 + .57	47.84 + .05	56.39 + .14	22.06 + .33	28.76 + .44	59.87 + .19
Jan. 9.5	19.02 .08	46.69 .10	60.14 + .39	47.85 - .07	56.51 .10	22.26 .17	29.14 .38	60.04 .15
19.5	19.08 + .04	46.76 + .04	60.29 - .04	47.70 .30	56.58 + .05	22.40 .10	29.39 + .16	60.17 .09
29.4	19.08 - .02	46.77 - .02	60.05 .45	47.44 .31	56.60 .00	22.46 + .02	29.47 - .05	60.22 + .03
Feb. 8.4	19.04 .07	46.71 .09	59.39 .79	47.08 .42	56.57 - .05	22.45 - .05	29.29 .32	60.23 - .03
18.4	18.94 - .19	46.59 - .15	58.48 - .98	46.61 - .51	56.50 - .10	22.37 - .12	29.04 - .30	60.17 - .08
28.4	18.81 .14	46.42 .18	57.43 1.34	46.06 .59	56.38 .13	22.22 .18	28.68 .47	60.08 .11
Mar. 10.3	18.65 .17	46.23 .31	56.01 1.51	45.44 .84	56.24 .15	22.02 .31	28.11 .56	59.95 .15
20.3	18.47 .19	46.01 .33	54.42 1.56	44.78 .67	56.08 .17	21.80 .34	27.56 .66	59.78 .17
30.3	18.28 .19	45.78 .33	52.90 1.55	44.10 .69	55.90 .18	21.54 .36	26.80 .73	59.60 .18
Apr. 9.2	18.09 - .18	45.55 - .22	51.33 -1.54	43.41 - .68	55.72 - .18	21.27 - .37	26.10 - .73	59.42 - .18
19.2	. . .	45.35 - .19	49.83 -1.54	42.74 - .66	55.55 - .17	21.01 - .25	25.35 - .73	59.24 - .17
Nov. 14.6	21.04 + .39							
24.6	21.32 .37	49.29 + .31	67.00 +1.56	46.40 + .49	58.49 + .37	24.73 + .41	32.68 + .86	62.12 + .33
Dec. 4.6	21.58 + .34	49.59 + .39	68.45 +1.34	46.83 + .37	58.74 + .34	25.12 + .37	33.51 + .77	62.43 + .39
14.6	21.79 .31	49.87 .35	69.70 1.15	47.14 .35	58.96 .31	25.47 .32	34.24 .69	62.70 .36
24.5	21.98 .17	50.09 .30	70.79 .84	47.32 .14	59.16 .18	25.76 .36	34.93 .58	62.94 .32
34.5	22.12 + .11	50.26 + .14	71.44 + .40	47.42 + .05	59.31 + .13	26.02 + .34	35.43 + .40	63.15 + .19
Mean Solar Date.	ζ <sup>1</sup> Cancri.	β Cancri.	30 Mono- cerotis.	θ Chamæ- leontis.	σ Hydræ.	γ Cancri.	σ <sup>2</sup> Cancri.	θ Hydræ.
	72° 0' h m 8 5	80° 28' h m 8 10	93° 32' h m 8 19	167° 7' h m 8 24	86° 15' h m 8 32	68° 7' h m 8 36	58° 59' h m 8 47	87° 12' h m 9 8
(Dec.30.6)	38.40 + .19	18.11 + .19	56.27 + .30	11.17 + .33	46.23 + .21	39.17 + .22	14.93 + .26	24.13 + .25
Jan. 9.5	38.57 .15	18.28 .15	56.44 .15	11.42 + .17	46.41 .17	39.37 .18	15.16 .21	24.35 .20
19.5	38.70 .10	18.41 .10	56.56 .09	11.61 - .01	46.56 .12	39.53 .14	15.34 .15	24.52 .14
29.5	38.77 + .05	18.47 + .04	56.62 + .04	11.39 .30	46.64 .06	39.64 .08	15.46 .09	24.64 .10
Feb. 8.5	38.79 .00	18.49 - .01	56.64 .00	11.11 .36	46.68 + .02	39.68 + .02	15.52 + .04	24.71 + .05
18.4	38.76 - .05	18.46 - .05	56.62 - .05	10.66 - .54	46.67 - .03	39.68 - .03	15.54 - .01	24.74 .00
28.4	38.68 .10	18.39 .10	56.55 .10	10.04 .68	46.61 .08	39.62 .08	15.49 .07	24.71 - .05
Mar. 10.4	38.55 .14	18.27 .13	56.43 .13	9.30 .79	46.51 .11	39.52 .12	15.38 .12	24.65 .09
20.4	38.40 .16	18.13 .16	56.30 .15	8.46 .88	46.39 .14	39.39 .14	15.25 .14	24.54 .11
30.3	38.23 .17	17.96 .17	56.14 .17	7.54 .95	46.24 .16	39.24 .16	15.09 .17	24.42 .13
Apr. 9.3	38.06 - .18	17.80 - .17	55.97 - .17	6.57 - .99	46.08 - .16	39.07 - .17	14.92 - .18	24.28 - .14
19.3	37.88 .17	17.63 .17	55.80 .16	5.56 1.01	45.92 .16	38.90 .17	14.73 .19	24.13 .15
29.3	37.72 .16	17.46 .16	55.64 .15	4.55 1.00	45.76 .15	38.73 .16	14.54 .18	23.98 .15
May 9.2	37.57 - .15	17.32 - .13	55.49 - .14	3.56 - .97	45.61 - .14	38.57 - .15	14.37 - .16	23.83 .15
19.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	23.69 - .14
Dec. 14.6	41.07 + .36	20.62 + .25	58.55 + .38	8.82 + .63				
24.6	41.31 .22	20.85 .22	58.80 .22	9.37 .47				
34.6	41.51 + .18	21.05 + .18	58.99 + .16	9.75 + .30				

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Mean Solar Date.	$\beta$ Argus.	$\alpha$ Lyncis.	10 Leonis Minoris.	$\epsilon$ Leonis.	$\zeta$ Chamæ- leontis.	19 Leonis Minoris.	$\pi$ Leonis.	$\lambda$ Ursæ Majoris.
	159° 15'	55° 7'	53° 6'	79° 35'	170° 25'	48° 24'	81° 24'	46° 31'
	h m 9 11	h m 9 14	h m 9 27	h m 9 35	h m 9 37	h m 9 50	h m 9 54	h m 10 10
(Dec.30.6)	60.33 + .39	3.99 + .39	11.72 + .39	1.85 + .36	22.99 + .88	39.29 + .35	9.19 + .96	10.29 + .37
Jan. 9.6	60.67 .29	4.25 .94	11.99 .26	2.09 .29	23.70 .60	39.61 .30	9.43 .23	10.64 .33
19.6	60.90 .17	4.46 .19	12.23 .21	2.29 .18	24.19 .41	39.88 .25	9.65 .90	10.95 .27
29.5	61.01 + .05	4.63 .13	12.41 .15	2.45 .13	24.52 + .30	40.10 .19	9.82 .15	11.18 .90
Feb. 8.5	61.00 - .07	4.72 .07	12.53 .09	2.55 .08	24.58 - .07	40.25 .11	9.95 .10	11.36 .14
18.5	60.87 - .19	4.76 + .02	12.58 + .03	2.60 + .03	24.37 - .31	40.32 + .05	10.01 + .05	11.46 + .08
28.5	60.63 .29	4.75 - .04	12.58 - .03	2.61 - .02	23.96 .48	40.35 .00	10.04 + .01	11.52 + .03
Mar. 10.4	60.29 .37	4.68 .10	12.52 .09	2.57 .06	23.40 .66	40.32 - .07	10.02 - .04	11.51 - .04
20.4	59.89 .44	4.55 .14	12.40 .13	2.49 .10	22.65 .88	40.21 .13	9.96 .08	11.44 .10
30.4	59.42 .50	4.40 .16	12.26 .16	2.38 .12	21.65 1.02	40.08 .15	9.87 .11	11.30 .15
Apr. 9.3	58.89 - .54	4.23 - .18	12.09 - .18	2.25 - .14	20.61 -1.08	39.92 - .18	9.75 - .13	11.15 - .17
19.3	58.34 .57	4.04 .19	11.91 .20	2.11 .15	19.49 1.18	39.73 .20	9.61 .14	10.97 .19
29.3	57.76 .58	3.84 .20	11.70 .20	1.96 .15	18.25 1.28	39.52 .21	9.48 .14	10.76 .21
May 9.3	57.18 .58	3.65 .18	11.52 .18	1.82 .14	16.93 1.33	39.32 .20	9.34 .14	10.55 .21
19.2	56.61 - .57	3.49 - .15	11.35 - .15	1.68 - .13	15.70 -1.29	39.12 - .19	9.20 - .14	10.35 .20
29.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	10.15 - .19
June 8.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	9.98 - .16
Mean Solar Date.	$\mu$ Hydræ.	$\beta$ Leonis Minoris.	$\alpha$ Antilæ.	$\beta$ Octantis, S. P.	41 Leonis Minoris.	$\delta$ Chamæ- leontis.	46 Leonis Minoris.	Groom. 1706.
	106° 15'	52° 42'	120° 29'	188° 1'	66° 13'	169° 56'	55° 10'	11° 37'
	h m 10 20	h m 10 21	h m 10 21	h m 10 34	h m 10 37	h m 10 44	h m 10 46	h m 10 50
(Dec.30.7)	32.91 + .26	14.61 + .35	54.79 + .28	5.11 -1.07	10.42 + .32	48.45 +1.12	53.28 + .34	43.80 +1.17
Jan. 9.6	33.16 .24	14.94 .31	55.06 .26	4.15 .87	10.72 .29	49.48 .24	53.61 .29	44.91 1.08
19.6	33.39 .29	15.23 .27	55.30 .29	3.38 .68	10.99 .25	50.34 .77	53.92 .29	45.94 .29
29.6	33.59 .17	15.47 .21	55.49 .17	2.80 .50	11.21 .20	51.01 .58	54.16 .29	46.75 .72
Feb. 8.6	33.73 .19	15.65 .15	55.64 .12	2.39 - .23	11.39 .16	51.49 .37	54.36 .18	47.38 .55
18.5	33.82 + .07	15.77 + .09	55.72 + .06	2.35 + .08	11.52 + .10	51.74 + .15	54.51 + .12	47.86 + .38
28.5	33.86 + .03	15.83 + .03	55.76 + .01	2.56 .26	11.59 + .05	51.79 - .05	54.59 .06	48.13 + .12
Mar. 10.5	33.87 - .02	15.83 - .02	55.74 - .03	2.86 .44	11.61 .00	51.63 .25	54.62 + .01	48.09 - .12
20.4	33.83 .06	15.79 .08	55.70 .07	3.45 .76	11.59 - .04	51.29 .43	54.61 - .04	47.88 .26
30.4	33.75 .10	15.68 .12	55.60 .11	4.37 .98	11.53 .08	50.76 .60	54.55 .09	47.57 .44
Apr. 9.4	33.64 - .12	15.55 - .14	55.48 - .13	5.40 +1.10	11.43 - .11	50.09 - .74	54.44 - .12	47.01 - .66
19.4	33.52 .13	15.40 .16	55.34 .15	6.55 1.26	11.32 .12	49.28 .87	54.32 .14	46.26 .76
29.3	33.39 .14	15.23 .18	55.18 .16	7.91 1.46	11.19 .14	48.35 .96	54.17 .16	45.49 .82
May 9.3	33.25 .14	15.04 .19	55.03 .16	9.45 1.56	11.04 .15	47.32 1.06	54.01 .16	44.62 .90
19.3	33.11 .14	14.86 .18	54.87 .17	11.02 1.58	10.90 .14	46.24 1.11	53.85 .17	43.71 .96
29.3	32.97 - .13	14.69 - .17	54.70 - .16	12.60 +1.63	10.76 - .14	45.11 -1.15	53.68 - .17	42.71 - .96
June 8.2	32.84 - .12	14.53 - .15	54.55 - .14	14.27 +1.69	10.62 - .13	43.94 -1.18	53.52 - .16	41.79 - .86

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Mean Solar Date.	$\gamma$ Octantis.	$\rho^2$ Leonis.	$\psi$ Ura. Maj.	$\nu$ Ura. Maj.	$\xi$ Hydræ.	$\chi$ Ura. Maj.	$\pi$ Virginis.	$\epsilon$ Corvi.
	173° 59' h m 11 0	87° 25' h m 11 1	44° 53' h m 11 3	56° 17' h m 11 12	121° 13' h m 11 27	41° 35' h m 11 39	82° 45' h m 11 54	111° 59' h m 12 4
(Dec. 30.7)	15.87 +1.85	2.99 + .33	12.05 + .41	16.44 + .37	21.83 + .35	58.50 + .45	59.16 + .38	
Jan. 9.7	17.61 1.63	3.29 .98	12.44 .38	16.79 .33	22.16 .31	58.93 .41	59.47 .30	
19.6	19.11 1.36	3.54 .94	12.80 .33	17.10 .30	22.45 .28	59.32 .38	59.77 .26	
29.6	20.32 1.04	3.76 .91	13.10 .27	17.37 .25	22.71 .24	59.68 .33	60.02 .24	
Feb. 8.6	21.19 .70	3.95 .16	13.34 .22	17.60 .21	22.93 .20	59.98 .27	60.25 .21	14.58 + .29
18.6	21.73 + .37	4.08 + .11	13.53 + .16	17.78 + .15	23.10 + .15	60.22 + .21	60.44 + .17	14.78 + .18
28.5	21.93 + .04	4.17 .07	13.65 .09	17.90 .09	23.22 .09	60.40 .15	60.59 .13	14.94 .14
Mar. 10.5	21.81 - .29	4.21 + .03	13.70 + .03	17.96 + .04	23.28 + .04	60.51 .07	60.69 .08	15.05 .09
20.5	21.35 .80	4.22 - .01	13.70 - .03	17.97 - .01	23.30 .00	60.54 + .01	60.74 .04	15.11 .05
30.4	20.62 .98	4.18 .04	13.64 .09	17.94 .05	23.29 - .03	60.53 - .04	60.77 + .01	15.14 + .02
Apr. 9.4	19.58 -1.16	4.13 - .07	13.53 - .13	17.87 - .09	23.24 - .06	60.46 - .09	60.76 - .03	15.14 - .02
19.4	18.32 1.38	4.04 .10	13.39 .16	17.76 .12	23.16 .10	60.34 .14	60.72 .06	15.11 .04
29.4	16.82 1.59	3.93 .11	13.22 .18	17.63 .14	23.05 .12	60.19 .17	60.65 .06	15.06 .07
May 9.3	15.15 1.74	3.82 .12	13.03 .20	17.48 .16	22.93 .13	60.01 .19	60.57 .00	14.98 .09
19.3	13.35 1.85	3.70 .12	12.83 .21	17.32 .16	22.80 .14	59.81 .21	60.47 .10	14.88 .10
29.3	11.45 -1.94	3.58 - .12	12.62 - .21	17.17 - .14	22.66 - .13	59.60 - .21	60.37 - .09	14.78 - .11
June 8.3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	14.66 .12
18.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	14.54 - .11
Mean Solar Date.	2 Can. Ven.	6 Ura. Min.	$\delta^2$ Corvi.	$\beta$ Can. Ven.	$\gamma$ Virginis. (mean.)	31 Cor. Bor.	$\gamma$ Cass., S.P.	43 Cephei, S. P.
	48° 42' h m 12 10	1° 40' h m 12 14	105° 52' h m 12 23	48° 1' h m 12 28	90° 49' h m 12 35	61° 50' h m 12 46	330° 6' h m 12 49	355° 38' h m 12 53
Feb. 8.6	22.96 + .98	30.11 +5.72	56.62 + .23	17.95 + .28	51.40 + .24	6.97 + .27	46.55 - .31	11.57 -2.40
18.6	23.20 .29	35.47 4.63	56.83 .19	18.21 .24	51.62 .20	7.22 .23	46.25 .25	9.18 2.02
28.6	23.40 .17	39.32 3.05	57.00 .15	18.43 .19	51.79 .17	7.43 .19	46.06 .17	7.45 1.48
Mar. 10.5	23.54 .11	41.54 1.70	57.13 .11	18.59 .13	51.93 .12	7.69 .14	45.92 .12	6.22 1.07
20.5	23.62 .06	42.69 + .56	57.22 .07	18.69 .08	52.02 .06	7.71 .09	45.81 - .06	5.32 .62
30.5	23.65 + .01	42.64 - .25	57.27 + .04	18.75 + .03	52.09 + .05	7.77 + .05	45.81 + .06	4.98 - .01
Apr. 9.5	23.64 - .04	40.79 2.58	57.29 + .01	18.75 - .02	52.12 + .02	7.81 + .02	45.92 .14	5.30 + .60
19.4	23.58 .07	37.50 3.61	57.28 - .02	18.71 .07	52.12 - .01	7.80 - .02	46.10 .20	6.18 1.04
29.4	23.50 .12	33.51 4.48	57.25 .05	18.62 .10	52.09 .04	7.77 .05	46.33 .26	7.38 1.43
May 9.4	23.35 .15	28.57 5.60	57.19 .07	18.51 .13	52.05 .05	7.70 .08	46.65 .38	9.03 1.97
19.3	23.20 - .16	22.35 -6.50	57.11 - .09	18.37 - .15	51.99 - .07	7.62 - .10	47.08 + .43	11.30 +2.36
29.3	23.04 .17	15.62 6.72	57.02 .10	18.21 .17	51.91 .09	7.50 .12	47.50 .44	13.74 2.50
June 8.3	22.86 .18	8.96 6.86	56.91 .11	18.04 .18	51.82 .10	7.38 .13	47.96 .50	16.28 2.73
18.3	22.68 - .18	1.95 -7.21	56.80 - .11	17.85 - .20	51.71 - .11	7.25 - .13	48.49 + .53	19.18 +2.93

APPARENT RIGHT ASCENSIONS AND APPROXIMATE NORTH POLAR DISTANCES  
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Mean Solar Date.	$\delta$ Muscæ.	$\epsilon$ Virginis.	20 Can. Ven.	$\kappa$ Octantis.	B.A.C. 4536.	$\nu$ Virginis.	$\theta$ Apodis.	$\pi$ Hydræ.
	160° 56'	78° 25'	48° 49'	175° 12'	52° 14'	98° 7'	166° 14'	116° 8'
	<sub>h m</sub> 12 54	<sub>h m</sub> 12 56	<sub>h m</sub> 13 12	<sub>h m</sub> 13 22	<sub>h m</sub> 13 29	<sub>h m</sub> 13 35	<sub>h m</sub> 13 54	<sub>h m</sub> 13 59
Feb. 8.7	27.17 + .64	28.32 + .96						
18.6	27.74 .51	28.56 .32						
28.6	28.19 .42	28.76 .18	24.52 + .23	51.14 + 1.90	40.99 + .26	36.28 + .20	16.31 + .82	
Mar. 10.6	28.57 .33	28.92 .15	24.73 .10	52.86 1.47	41.22 .20	36.47 .18	17.06 .68	
20.6	28.84 .23	29.05 .10	24.90 .13	54.05 1.01	41.39 .15	36.63 .15	17.67 .55	51.87 + .18
30.5	29.03 + .13	29.12 + .06	24.99 + .08	54.88 + .73	41.52 + .10	36.76 + .11	18.16 + .42	52.03 + .15
Apr. 9.5	29.10 + .03	29.17 + .03	25.06 + .04	55.50 + .42	41.60 .06	36.85 .08	18.52 .20	52.16 .11
19.5	29.09 - .06	29.19 .00	25.07 - .01	55.72 - .06	41.63 + .02	36.91 .05	18.74 .15	52.25 .08
29.5	28.98 .14	29.17 - .03	25.05 .05	55.38 .53	41.63 - .02	36.94 + .02	18.83 + .03	52.32 .05
May 9.4	28.80 .23	29.14 .05	24.98 .09	54.68 .79	41.60 .05	36.95 .00	18.90 - .10	52.35 + .02
19.4	28.51 - .31	29.08 - .07	24.87 - .12	53.82 - 1.08	41.53 - .09	36.93 - .03	18.63 - .24	52.36 .00
29.4	28.18 .37	29.00 .09	24.75 .14	52.52 1.53	41.42 .12	36.89 .05	19.33 .35	52.34 - .03
June 8.3	27.78 .44	28.91 .10	24.60 .16	50.76 1.81	41.29 .13	36.83 .06	17.94 .46	52.30 .06
18.3	27.31 - .51	28.80 - .11	24.43 .18	48.93 1.93	41.16 .15	36.76 .09	17.41 .57	52.22 .09
28.3	. . .	. . .	24.25 .18	46.91 2.16	41.00 .17	36.65 .11	16.81 .65	52.12 .11
July 8.3	. . .	. . .	24.07 - .17	44.62 - 2.36	40.83 - .18	36.54 - .12	16.12 - .75	52.00 - .13
18.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51.86 .14
28.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51.72 - .14
Mean Solar Date.	$\delta$ Bootis.	$\kappa$ Virginis.	$\delta$ Octantis.	4 Urs. Min.	$\lambda$ Bootis.	$\lambda$ Virginis.	$\alpha$ Apodis.	$\mu$ Hydri, S. P.
	64° 22'	99° 44'	173° 8'	11° 55'	43° 23'	102° 50'	168° 33'	190° 23'
	<sub>h m</sub> 14 5	<sub>h m</sub> 14 6	<sub>h m</sub> 14 8	<sub>h m</sub> 14 9	<sub>h m</sub> 14 12	<sub>h m</sub> 14 12	<sub>h m</sub> 14 33	<sub>h m</sub> 14 33
Mar. 20.6	10.03 + .18	47.70 + .18	51.88 + 1.17	21.40 + .62	2.30 + .22	55.29 + .18	46.49 + .84	59.39 - .80
30.6	11.09 .14	47.86 .14	52.93 .93	21.94 .42	2.49 .17	55.46 .15	47.26 .70	58.68 .66
Apr. 9.5	11.20 .09	47.99 .11	53.75 .67	22.24 .19	2.63 .11	55.59 .13	47.88 .55	58.09 .52
19.5	11.27 .06	48.07 .08	54.26 .39	22.32 + .02	2.71 .06	55.70 .08	48.35 .39	57.66 .32
29.5	11.32 + .04	48.14 .05	54.53 + .12	22.28 - .13	2.75 + .02	55.76 .06	46.66 .23	57.48 - .08
May 9.4	11.34 .00	48.17 + .02	54.50 - .16	22.06 - .33	2.75 - .03	55.81 + .03	48.80 + .07	57.50 + .08
19.4	11.32 - .03	48.19 .00	54.21 .41	21.61 .52	2.69 .08	55.82 .00	48.79 - .09	57.65 .27
29.4	11.28 .06	48.18 - .02	53.68 .67	21.04 .62	2.59 .12	55.82 - .02	48.61 .26	58.03 .50
June 8.4	11.21 .08	48.14 .05	52.87 .93	20.38 .72	2.46 .15	55.78 .04	48.27 .41	58.64 .68
18.3	11.12 .11	48.08 .07	51.83 1.14	19.61 .85	2.30 .16	55.73 .06	47.78 .55	59.38 .80
28.3	11.00 - .13	48.00 - .09	50.60 - 1.31	18.69 - .94	2.11 - .20	55.65 - .10	47.17 - .68	60.22 + .94
July 8.3	10.86 .14	47.89 .09	49.20 1.48	17.73 .96	1.90 .22	55.53 .12	46.42 .80	61.26 1.10
18.3	10.72 .15	47.77 .12	47.65 1.61	16.78 .97	1.68 .23	55.41 .12	45.58 .89	62.41 1.16
28.2	10.56 - .16	47.64 - .13	45.98 - 1.72	15.80 - 1.00	1.44 - .24	55.28 - .13	44.65 - .97	63.58 + 1.18

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Mean Solar Date.	33 Bootis.	47 Cephei, S. P.	γ Scorpil.	δ Bootis	ρ Octantis.	β Cor. Bor.	γ Camelop., S. P.	δ <sup>1</sup> Apodis.
	45° 6'	348° 58'	114° 50'	56° 15'	174° 5'	60° 30'	340° 59'	168° 24'
	<sub>h m</sub> 14 34	<sub>h m</sub> 14 50	<sub>h m</sub> 14 57	<sub>h m</sub> 15 10	<sub>h m</sub> 15 17	<sub>h m</sub> 15 23	<sub>h m</sub> 15 38	<sub>h m</sub> 16 3
Mar. 20.6	34.95 + .23	49.49 - .73	22.55 + .23					
30.6	35.16 .19	48.89 .50	22.77 .20	53.63 + .21	12.86 +1.72	6.85 + .22	13.75 - .37	
Apr. 9.6	35.33 .14	48.51 .29	22.96 .17	53.82 .17	14.49 1.46	7.05 .18	13.45 .27	20.61 + .95
19.5	35.44 .09	48.31 - .22	23.12 .15	53.97 .13	15.75 1.09	7.21 .14	13.21 .18	21.49 .81
29.5	35.50 .05	48.06 + .08	23.26 .11	54.08 .09	16.64 .76	7.34 .11	13.09 - .06	22.23 .66
May 9.5	35.54 + .01	48.46 + .46	23.34 + .07	54.15 + .06	17.26 + .52	7.43 + .08	13.10 + .10	22.81 + .51
19.5	35.52 - .04	48.98 .55	23.40 .05	54.20 + .03	17.68 + .18	7.49 + .04	13.30 .24	23.24 .34
29.4	35.46 .08	49.58 .67	23.44 + .02	54.20 - .03	17.62 - .24	7.51 .00	13.57 .32	23.49 + .17
June 8.4	35.35 .12	50.31 .88	23.44 - .02	54.17 .05	17.19 .53	7.49 - .04	13.93 .46	23.57 .00
18.4	35.23 .15	51.33 1.06	23.41 .04	54.10 .09	16.57 .78	7.44 .06	14.48 .58	23.48 - .18
28.4	35.06 - .18	52.43 +1.12	23.36 - .07	54.00 - .12	15.64 -1.15	7.37 - .09	15.07 + .02	23.20 - .36
July 8.3	34.87 .21	53.55 1.17	23.27 .11	53.87 .14	14.30 1.43	7.25 .13	15.70 .68	22.76 .51
18.3	34.65 .23	54.77 1.26	23.15 .13	53.71 .16	12.78 1.60	7.11 .15	16.42 .76	22.19 .66
28.3	34.42 - .23	56.06 +1.31	23.02 - .13	53.54 .13	11.11 1.74	6.95 .17	17.21 .80	21.45 .79
Aug. 7.3	. . .	. . .	. . .	53.35 .20	9.32 1.90	6.77 .19	18.00 .78	20.62 .88
17.2	. . .	. . .	. . .	53.14 - .21	7.34 -1.99	6.57 - .20	18.75 + .78	19.69 - .25
27.2	. . .	. . .	. . .	52.94 - .20	5.36 -1.87	6.38 - .19	19.54 + .80	18.73 .98
Sept. 6.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	17.74 .97
16.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	16.79 - .93
Mean Solar Date.	φ Herculis.	σ Cor. Bor. (mean.)	γ Apodis.	η Urs. Min.	η Ophiuchi.	π Herculis.	θ Ophiuchi.	δ Aræ.
	44° 46'	55° 51'	168° 38'	13° 59'	105° 35'	53° 4'	114° 53'	150° 35'
	<sub>h m</sub> 16 5	<sub>h m</sub> 16 10	<sub>h m</sub> 16 15	<sub>h m</sub> 16 20	<sub>h m</sub> 17 3	<sub>h m</sub> 17 11	<sub>h m</sub> 17 14	<sub>h m</sub> 17 20
Apr. 9.6	10.27 + .26	23.89 + .22	59.09 +1.00	54.90 + .63				
19.6	10.50 .21	24.10 .20	60.03 .87	55.45 .51				
29.6	10.68 .16	24.28 .16	60.84 .73	55.91 .38				
May 9.6	10.82 .12	24.42 .12	61.48 .57	56.20 .20	49.46 + .17	4.64 + .19	59.45 + .22	47.72 + .37
19.5	10.92 .07	24.52 .08	61.98 .41	56.32 + .04	49.63 .16	4.81 .16	59.66 .20	48.07 .33
29.5	10.96 + .02	24.58 + .04	62.30 + .23	56.29 - .10	49.79 + .14	4.95 + .11	59.84 + .16	48.38 + .26
June 8.5	10.96 - .02	24.60 + .01	62.44 + .05	56.13 .24	49.90 .10	5.02 .06	59.98 .12	48.59 .18
18.4	10.91 .07	24.60 - .03	62.39 - .13	55.80 .40	49.98 .07	5.07 + .03	60.08 .08	48.75 .11
28.4	10.81 .12	24.54 .08	62.18 .30	55.33 .52	50.03 + .03	5.08 - .02	60.13 + .04	48.82 + .04
July 8.4	10.67 .16	24.45 .11	61.78 .48	54.77 .62	50.03 - .01	5.03 .06	60.16 .00	48.82 - .03
18.4	10.50 - .19	24.32 - .15	61.23 - .63	54.10 - .74	50.01 - .05	4.95 - .10	60.14 - .04	48.76 - .11
28.3	10.20 .22	24.16 .17	60.52 .77	53.30 .24	49.94 .09	4.81 .16	60.08 .09	48.60 .19
Aug. 7.3	10.06 .25	23.98 .20	59.70 .86	52.43 .80	49.83 .12	4.64 .19	59.96 .13	48.38 .25
17.3	9.80 .27	23.77 .22	58.76 .96	51.53 .92	49.70 .15	4.44 .21	59.82 .15	48.10 .31
27.3	9.52 .28	23.55 .23	57.78 1.00	50.61 .25	49.53 .17	4.22 .24	59.66 .17	47.77 .35
Sept. 6.2	9.24 - .28	23.32 - .23	56.77 -1.00	49.64 - .96	49.36 - .18	3.97 - .25	59.48 - .19	47.40 - .38
16.2	8.96 - .28	23.09 - .23	55.78 - .97	48.69 - .92	49.17 .19	3.72 .26	59.28 .20	47.02 .39
26.2	. . .	. . .	. . .	. . .	48.99 .17	3.46 .25	59.08 .19	46.63 .38
Oct. 6.2	. . .	. . .	. . .	. . .	48.83 - .15	3.22 - .23	58.90 - .17	46.27 - .34

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Mean Solar Date.	Groom. 944, S. P.	$\epsilon$ Heroulis.	$\theta$ Heroulis.	$\sigma$ Heroulis.	$\lambda$ Sagittarii.	$\chi$ Draconis.	$\zeta$ Pavonis.	$\gamma$ Lyræ.
	355° 8' h m 17 25	43° 56' h m 17 36	52° 44' h m 17 52	61° 15' h m 18 3	115° 29' h m 18 20	17° 19' h m 18 23	161° 31' h m 18 29	57° 28' h m 18 54
May 9.6	9.12 - .93	15.35 + .95	20.56 + .96					
19.6	8.53 .48	15.57 .19	20.79 .90	5.63 + .19	54.99 + .94	11.23 + .48	41.32 + .63	40.64 + .94
29.6	8.17 - .13	15.73 .13	20.96 .16	5.81 .17	55.22 .99	11.61 .38	41.91 .55	40.87 .99
June 8.5	8.27 + .44	15.83 .08	21.10 .11	5.97 .13	55.43 .19	11.87 .18	42.41 .45	41.07 .18
18.5	9.05 .98	15.90 + .04	21.18 .06	6.07 .08	55.60 .15	11.96 + .05	42.80 .34	41.23 .14
28.5	10.18 + 1.95	15.91 - .09	21.22 + .03	6.13 + .04	55.73 + .11	11.97 - .08	43.08 + .39	41.35 + .09
July 8.5	11.54 1.65	15.87 .08	21.23 - .02	6.15 .00	55.81 .06	11.85 .19	43.23 + .09	41.41 + .05
18.4	13.46 2.08	15.76 .12	21.17 .08	6.13 - .05	55.84 + .01	11.59 .38	43.26 - .04	41.44 .00
28.4	15.67 2.34	15.62 .17	21.07 .12	6.06 .10	55.83 - .03	11.22 .49	43.15 .16	41.41 - .05
Aug. 7.4	18.13 2.64	15.42 .21	20.93 .16	5.94 .14	55.78 .08	10.76 .59	42.94 .37	41.34 .10
17.4	20.72 + 2.79	15.20 - .95	20.75 - .90	5.79 - .16	55.68 - .19	10.20 - .62	42.61 - .38	41.22 - .14
27.3	23.54 2.97	14.93 .98	20.54 .92	5.62 .19	55.55 .15	9.52 .70	42.18 .48	41.06 .18
Sept. 6.3	26.64 3.03	14.65 .30	20.31 .96	5.42 .21	55.38 .18	8.81 .74	41.66 .55	40.87 .21
16.3	29.58 2.92	14.34 .31	20.05 .98	5.20 .23	55.20 .19	8.06 .78	41.08 .60	40.65 .23
26.3	32.46 2.97	14.03 .30	19.79 .98	4.97 .23	55.00 .20	7.27 .80	40.47 .62	40.42 .23
Oct. 6.2	35.51 + 2.96	13.74 - .98	19.53 - .96	4.75 - .22	54.81 - .20	6.47 - .79	39.85 - .62	40.19 - .24
16.2	. . .	. . .	. . .	4.53 - .21	54.61 - .19	5.69 - .77	39.23 - .61	39.95 - .23
Mean Solar Date.	$\epsilon$ Lyræ.	$\delta$ Camelop. S. P.	$\theta$ Lyræ.	$\beta$ Cygni.	$\beta$ Sagittæ.	$\delta$ Cygni.	Groom. 1374, S. P.	$\epsilon$ Pavonis.
	54° 5' h m 19 3	352° 38' h m 19 6	52° 4' h m 19 12	62° 17' h m 19 26	72° 47' h m 19 35	45° 9' h m 19 41	344° 13' h m 19 46	163° 13' h m 19 47
May 19.6	14.01 + .98	45.97 - .94						
29.6	14.27 .94	45.09 .73	24.91 + .94	7.28 + .23	55.23 + .96	25.26 + .37	23.01 - .41	22.08 + .77
June 8.6	14.49 .90	44.51 .36	25.13 .90	7.50 .21	55.47 .92	25.51 .94	22.68 .94	22.80 .67
18.6	14.66 .15	44.38 - .06	25.31 .16	7.70 .18	55.67 .19	25.73 .90	22.54 .19	23.42 .57
28.5	14.79 .10	44.39 + .12	25.44 .11	7.86 .13	55.84 .15	25.91 .15	22.45 - .04	23.93 .46
July 8.5	14.86 + .05	44.63 + .44	25.52 + .06	7.95 + .08	55.96 + .10	26.02 + .09	22.46 + .12	24.33 + .33
18.5	14.88 .00	45.28 .78	25.55 + .01	8.02 + .04	56.03 .06	26.09 + .03	22.69 .98	24.59 .19
28.5	14.86 - .04	46.18 1.00	25.54 - .04	8.03 - .01	56.07 + .02	26.08 - .03	23.03 .36	24.71 + .05
Aug. 7.4	14.80 .09	47.27 1.18	25.47 .10	8.00 .05	56.06 - .03	26.04 .08	23.42 .45	24.69 - .09
17.4	14.67 .14	48.54 1.41	25.35 .14	7.93 .10	56.01 .08	25.92 .13	23.92 .58	24.53 .93
27.4	14.52 - .18	50.08 + 1.66	25.19 - .18	7.80 - .15	55.90 - .12	25.78 - .18	24.58 + .79	24.24 - .35
Sept. 6.3	14.32 .91	51.85 1.78	25.00 .91	7.64 .17	55.78 .14	25.57 .22	25.36 .78	23.84 .46
16.3	14.10 .94	53.61 1.81	24.77 .94	7.46 .20	55.62 .17	25.34 .25	26.13 .90	23.31 .56
26.3	13.85 .25	55.46 1.96	24.53 .96	7.25 .22	55.44 .19	25.08 .28	26.96 .91	22.72 .62
Oct. 6.3	13.61 .25	57.57 2.08	24.27 .95	7.03 .22	55.25 .19	24.79 .29	27.95 .98	22.07 .67
16.2	13.36 - .94	59.61 + 1.96	24.02 - .95	6.82 - .21	55.06 - .19	24.51 - .29	28.91 + .95	21.39 - .69
26.2	13.12 .23	61.51 1.94	23.77 .94	6.61 .20	54.87 .18	24.22 .29	29.84 .96	20.70 .67
Nov. 5.2	12.91 - .20	63.49 + 1.93	23.54 - .22	6.41 - .19	54.70 - .16	23.93 - .28	30.83 + .99	20.05 - .68



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Mean Solar Date.	$\gamma$ Sagittæ.	$\sigma$ Sagittari.	$\theta$ Aquilæ.	$\sigma^1$ Cygni.	$\alpha$ Delphini.	$\beta$ Pavonis.	$\psi$ Capricor.	$\epsilon$ Cygni.
	70° 49' h m 19 53	118° 2' h m 19 55	91° 10' h m 20 5	43° 36' h m 20 10	74° 30' h m 20 34	156° 37' h m 20 34	115° 41' h m 20 39	56° 28' h m 20 41
May 29.6	40.72 + .37	37.44 + .30						
June 8.6	40.97 .33	37.72 .36						
18.6	41.18 .19	37.96 .34	24.82 + .30	3.52 + .32	20.28 + .34	39.29 + .50	19.63 + .37	36.12 + .35
28.6	41.36 .16	38.19 .31	25.01 .18	3.72 .19	20.50 .30	39.76 .44	19.88 .33	36.35 .32
July 8.5	41.50 .19	38.37 .16	25.18 .15	3.89 .13	20.68 .16	40.16 .36	20.09 .19	36.55 .17
18.5	41.59 + .37	38.51 + .11	25.30 + .10	3.98 + .07	20.82 + .11	40.47 + .36	20.27 + .16	36.69 + .11
28.5	41.64 + .03	38.59 .06	25.37 .06	4.02 + .02	20.90 .07	40.69 .16	20.40 .10	36.77 .07
Aug. 7.5	41.65 - .01	38.63 + .01	25.40 + .01	4.01 - .03	20.95 + .03	40.79 + .05	20.47 + .05	36.82 + .02
17.4	41.62 .06	38.61 - .04	25.39 - .03	3.92 .11	20.96 - .01	40.79 - .05	20.50 .00	36.81 - .03
27.4	41.54 .11	38.55 .09	25.34 .08	3.80 .15	20.92 .08	40.70 .14	20.48 - .04	36.76 .08
Sept. 6.4	41.41 - .14	38.43 - .14	25.24 - .11	3.69 - .30	20.84 - .10	40.50 - .35	20.42 - .09	36.65 - .13
16.4	41.27 .16	38.28 .16	25.12 .14	3.41 .34	20.72 .14	40.20 .33	20.31 .13	36.51 .16
26.3	41.09 .18	38.11 .18	24.97 .16	3.15 .37	20.57 .16	39.84 .30	20.16 .16	36.33 .19
Oct. 6.3	40.90 .19	37.93 .19	24.81 .17	2.87 .38	20.41 .17	39.42 .44	20.00 .17	36.14 .20
16.3	40.71 .20	37.73 .19	24.64 .17	2.59 .39	20.23 .18	38.96 .47	19.82 .18	35.93 .21
26.3	40.51 - .19	37.54 - .19	24.47 - .17	2.30 - .39	20.06 - .18	38.40 - .48	19.64 - .18	35.72 - .21
Nov. 5.2	40.33 .17	37.36 .18	24.30 .16	2.02 .38	19.88 .17	38.04 .46	19.46 .17	35.51 .21
15.2	40.15 .15	37.19 .17	24.16 .12	1.75 .36	19.72 .16	37.57 .43	19.30 .16	35.30 .20
25.2	39.99 - .13	37.04 - .15	24.06 - .08	1.51 - .32	19.57 - .14	37.16 - .39	19.15 - .14	35.11 - .18
Mean Solar Date.	$\tau$ Cygni.	$\zeta$ Capricor.	74 Cygni.	$\lambda^1$ Octantis.	$\zeta$ Cham., S. P.	$\pi^3$ Cygni.	16 Pegasi.	$\pi$ Pegasi.
	52° 27' h m 21 10	112° 55' h m 21 20	50° 6' h m 21 32	173° 15' h m 21 33	189° 35' h m 21 37	41° 13' h m 21 42	64° 37' h m 21 47	57° 23' h m 22 4
June 28.6	14.93 + .33	8.54 + .26	23.26 + .26	17.59 + 1.56	11.01 - .33	35.81 + .39	52.37 + .26	55.45 + .39
July 8.6	15.14 .30	8.78 .23	23.51 .23	19.07 1.35	10.12 .83	36.08 .25	52.61 .23	55.73 .27
18.6	15.32 .15	8.99 .19	23.71 .18	20.30 1.09	9.35 .66	36.31 .30	52.82 .19	55.97 .21
28.5	15.44 .10	9.16 .15	23.86 .13	21.25 .80	8.80 .42	36.48 .15	52.98 .14	56.15 .16
Aug. 7.5	15.51 + .06	9.28 .09	23.96 .08	21.91 .48	8.51 .22	36.60 .09	53.10 .10	56.29 .11
17.5	15.53 .00	9.34 + .04	24.01 + .03	22.21 + .14	8.37 - .04	36.65 + .02	53.17 + .05	56.37 + .07
27.5	15.51 - .05	9.36 .00	24.01 - .03	22.19 - .18	8.44 + .20	36.64 - .03	53.20 .00	56.42 + .02
Sept. 6.4	15.43 .11	9.34 - .04	23.95 .09	21.84 .53	8.78 .47	36.59 .09	53.18 - .04	56.41 - .03
16.4	15.30 .15	9.28 .09	23.84 .13	21.13 .85	9.37 .68	36.47 .15	53.12 .08	56.37 .07
26.4	15.14 .18	9.15 .13	23.70 .16	20.14 1.13	10.14 .84	36.30 .19	53.02 .11	56.28 .11
Oct. 6.4	14.95 - .30	9.02 - .14	23.53 - .19	18.87 - 1.37	11.06 + 1.05	36.10 - .22	52.90 - .13	56.16 - .14
16.3	14.75 .21	8.87 .16	23.33 .21	17.40 1.55	12.22 1.23	35.87 .24	52.76 .16	56.01 .16
26.3	14.53 .23	8.70 .17	23.11 .22	15.78 1.88	13.51 1.30	35.62 .26	52.59 .17	55.84 .18
Nov. 5.3	14.32 .22	8.53 .17	22.89 .23	14.04 1.74	14.80 1.34	35.35 .28	52.42 .17	55.66 .18
15.3	14.10 .21	8.37 .16	22.66 .22	12.30 1.72	16.17 1.38	35.07 .27	52.24 .17	55.47 .18
25.2	13.89 - .20	8.22 - .14	22.45 - .21	10.61 - 1.64	17.55 + 1.35	34.81 - .26	52.08 - .16	55.29 - .18
Dec. 5.2	13.70 - .18	8.09 - .12	22.24 - .20	9.03 - 1.51	18.86 + 1.22	34.55 - .25	51.93 - .14	55.12 - .17

APPARENT RIGHT ASCENSIONS AND APPROXIMATE NORTH POLAR DISTANCES  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\nu$ Octantis.	$\gamma$ Aquarii.	$\sigma$ Aquarii.	$\alpha$ Lacertæ.	10 Lacertæ.	$\beta$ Octantis.	$\lambda$ Pegasi.	Groombr. 1706, S. P.
	176° 33' h m 22 9	91° 58' h m 22 15	101° 16' h m 22 24	40° 19' h m 22 26	51° 33' h m 22 34	171° 59' h m 22 34	67° 2' h m 22 41	348° 23' h m 22 50
July 8.6	31.39 +2.90	45.49 + .95	36.01 + .96	36.59 + .30	9.05 + .98	18.98 +1.39	2.16 + .97	39.35 - .65
18.6	34.08 2.46	45.72 .91	36.25 .93	36.87 .96	9.31 .94	20.35 1.37	2.41 .94	38.82 .50
28.6	36.29 1.95	45.91 .17	36.46 .19	37.11 .93	9.53 .90	21.50 1.00	2.63 .90	38.35 .43
Aug. 7.6	37.96 1.39	46.06 .14	36.63 .15	37.30 .16	9.71 .16	22.34 .74	2.80 .15	37.96 .30
17.5	39.05 .77	46.18 .09	36.75 .10	37.42 .09	9.85 .11	22.98 .54	2.93 .11	37.74 - .11
27.5	39.49 + .11	46.24 + .04	36.82 + .06	37.47 + .03	9.92 + .05	23.42 + .37	3.01 + .07	37.74 + .06
Sept. 6.5	39.28 - .55	46.26 .00	36.86 + .02	37.48 - .02	9.94 .00	23.51 - .10	3.06 + .03	37.85 .15
16.5	38.38 1.90	46.25 - .03	36.86 - .02	37.43 .08	9.92 - .04	23.23 .38	3.06 - .02	38.04 .30
26.4	36.89 1.78	46.20 .07	36.82 .06	37.32 .13	9.86 .09	22.76 .58	3.02 .05	38.46 .53
Oct. 6.4	34.82 2.34	46.12 .10	36.74 .09	37.18 .16	9.75 .13	22.09 .85	2.97 .08	39.09 .66
16.4	32.21 -2.81	46.01 - .12	36.64 - .12	37.00 - .30	9.61 - .15	21.07 -1.14	2.86 - .12	39.77 + .75
26.3	29.23 3.14	45.89 .13	36.51 .13	36.79 .93	9.46 .17	19.83 1.37	2.73 .13	40.59 .92
Nov. 5.3	25.94 3.38	45.75 .14	36.38 .14	36.55 .95	9.28 .19	18.54 1.34	2.59 .14	41.59 1.06
15.3	22.50 3.48	45.61 .14	36.24 .14	36.30 .96	9.08 .30	17.18 1.44	2.45 .15	42.71 1.14
25.3	19.02 3.45	45.48 .13	36.10 .14	36.04 .96	8.89 .30	15.66 1.51	2.29 .15	43.86 1.18
Dec. 5.2	15.63 -3.29	45.35 - .12	35.97 - .13	35.78 - .25	8.69 - .30	14.16 -1.42	2.14 - .15	45.05 +1.24
15.2	12.48 -2.98	45.24 - .10	35.85 - .11	35.53 - .24	8.49 - .19	12.83 -1.27	2.00 - .14	46.32 +1.26
Mean Solar Date.	$\sigma$ Androm.	$\phi$ Aquarii.	$\tau$ Pegasi.	$\lambda$ Androm.	$\delta$ Aquarii.	$\delta$ Sculptoris.	$\gamma$ Octantis.	33 Piscium.
	48° 18' h m 22 56	96° 40' h m 23 8	66° 53' h m 23 14	44° 10' h m 23 31	108° 55' h m 23 38	118° 46' h m 23 42	172° 39' h m 23 45	96° 21' h m 23 59
July 8.7	40.82 + .30							
18.6	41.10 .97							
28.6	41.35 .93	24.74 + .92	59.76 + .92	59.86 + .98	16.70 + .97	58.54 + .97	22.45 +1.38	29.44 + .94
Aug. 7.6	41.56 .19	24.94 .18	59.96 .19	60.12 .94	16.94 .92	58.79 .93	23.77 1.23	29.67 .92
17.6	41.72 .13	25.10 .14	60.13 .15	60.33 .19	17.13 .18	59.00 .19	24.90 1.01	29.88 .19
27.5	41.82 + .08	25.22 + .10	60.25 + .10	60.49 + .14	17.29 + .14	59.17 + .15	25.77 + .73	30.04 + .15
Sept. 6.5	41.88 + .03	25.29 .06	60.32 .06	60.60 .08	17.40 .09	59.30 .10	26.35 .43	30.17 .11
16.5	41.88 - .02	25.33 + .02	60.36 + .03	60.65 + .03	17.47 .05	59.37 .05	26.63 + .13	30.25 .07
26.5	41.85 .06	25.33 - .02	60.37 - .02	60.66 - .01	17.50 + .02	59.40 + .02	26.61 - .18	30.31 + .04
Oct. 6.4	41.77 .10	25.30 .05	60.33 .05	60.63 .06	17.50 - .02	59.40 - .03	26.26 .40	30.32 .00
16.4	41.65 - .13	25.24 - .08	60.27 - .08	60.55 - .10	17.46 - .06	59.35 - .07	25.63 - .77	30.30 - .03
26.4	41.51 .16	25.15 .10	60.17 .11	60.43 .14	17.39 .09	59.27 .10	24.71 1.04	30.26 .06
Nov. 5.4	41.34 .18	25.03 .12	60.05 .12	60.28 .16	17.29 .11	59.15 .12	23.55 1.26	30.19 .08
15.3	41.15 .30	24.91 .12	59.92 .13	60.11 .19	17.17 .12	59.03 .13	22.19 1.43	30.10 .10
25.3	40.95 .21	24.79 .13	59.79 .14	59.91 .30	17.04 .13	58.89 .15	20.69 1.55	29.99 .11
Dec. 5.3	40.74 - .30	24.66 - .13	59.64 - .15	59.70 - .21	16.91 - .13	58.74 - .15	19.10 -1.61	29.88 - .12
15.3	40.54 .19	24.54 .11	59.50 .14	59.49 .92	16.78 .13	58.59 .15	17.48 1.02	29.76 .12
25.2	40.35 .18	24.44 .10	59.36 .13	59.27 .92	16.65 .12	58.44 .14	15.87 1.56	29.64 .12
35.2	40.18 - .16	24.35 - .08	59.23 - .12	59.05 - .21	16.53 - .11	58.30 - .13	14.37 -1.40	29.52 - .11

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Jan. 0	18 45 44.40	45.07	-23 2 6.7	5.8	11.038	+12.06	+ 3 38.10	16 18.42	1 11.10	18 42 6.38
1	18 50 9.16	9.91	22 57 3.5	2.5	11.094	13.20	4 6.31	16 18.41	1 11.05	18 46 2.93
2	18 54 33.57	34.40	22 51 32.9	31.8	11.010	14.34	4 34.17	16 18.41	1 11.00	18 40 59.49
3	18 58 57.61	58.53	22 45 34.9	33.6	10.994	15.47	5 1.65	16 18.40	1 10.95	18 53 56.05
4	19 3 21.25	22.26	22 39 9.8	8.3	10.977	16.60	5 28.74	16 18.37	1 10.89	18 57 52.61
5	19 7 44.47	45.56	-22 32 17.9	10.2	10.959	+17.71	+ 5 55.41	16 18.34	1 10.83	19 1 49.17
6	19 12 7.25	8.42	22 24 59.3	57.3	10.940	18.82	6 21.64	16 18.31	1 10.77	19 5 45.72
7	19 16 29.56	30.81	22 17 14.0	11.8	10.920	19.92	6 47.40	16 18.28	1 10.71	19 9 42.28
8	19 20 51.38	52.70	22 9 2.4	0.0	10.898	21.02	7 12.06	16 18.24	1 10.64	19 13 38.81
9	19 25 12.67	14.06	22 0 24.8	22.0	10.876	22.10	7 37.40	16 18.19	1 10.56	19 17 35.40
10	19 29 33.42	34.87	-21 51 21.4	18.2	10.853	+23.17	+ 8 1.60	16 18.14	1 10.48	19 21 31.95
11	19 33 53.60	55.12	21 41 52.5	49.0	10.829	24.23	8 25.22	16 18.09	1 10.40	19 25 28.51
12	19 38 13.18	14.76	21 31 58.3	54.5	10.803	25.28	8 48.26	16 18.03	1 10.31	19 29 25.06
13	19 42 32.14	33.78	21 21 39.2	35.1	10.777	26.31	9 10.66	16 17.97	1 10.22	19 33 21.62
14	19 46 50.46	52.16	21 10 55.3	50.9	10.750	27.33	9 32.42	16 17.90	1 10.13	19 37 18.18
15	19 51 8.12	9.88	-20 59 47.1	42.4	10.722	+28.34	+ 9 53.52	16 17.82	1 10.04	19 41 14.74
16	19 55 25.10	26.92	20 48 14.9	9.9	10.693	29.34	10 13.95	16 17.74	1 9.94	19 45 11.29
17	19 59 41.36	43.23	20 36 19.0	13.7	10.663	30.32	10 33.66	16 17.66	1 9.84	19 49 7.85
18	20 3 56.89	58.81	20 23 59.7	54.1	10.631	31.28	10 52.63	16 17.58	1 9.74	19 53 4.40
19	20 8 11.67	13.64	20 11 17.4	11.5	10.599	32.23	11 10.86	16 17.49	1 9.64	19 57 0.96
20	20 12 25.69	27.71	-19 58 12.5	6.2	10.567	+33.17	+11 28.32	16 17.40	1 9.53	20 0 57.51
21	20 16 38.93	40.99	19 44 45.2	38.6	10.535	34.08	11 45.00	16 17.31	1 9.43	20 4 54.07
22	20 20 51.38	53.48	19 30 56.0	49.1	10.502	34.99	12 0.88	16 17.21	1 9.32	20 8 50.62
23	20 25 3.02	5.16	19 16 45.3	38.0	10.469	35.88	12 15.96	16 17.11	1 9.21	20 12 47.18
24	20 29 13.85	16.03	19 2 13.3	5.7	10.435	36.76	12 30.24	16 17.00	1 9.10	20 16 43.73
25	20 33 23.87	26.08	-18 47 20.5	12.6	10.401	+37.62	+12 43.70	16 16.89	1 8.99	20 20 40.29
26	20 37 33.06	35.30	18 31 67.2	59.0	10.366	38.47	12 56.32	16 16.77	1 8.88	20 24 36.85
27	20 41 41.42	43.68	18 16 33.8	25.3	10.331	39.30	13 8.11	16 16.64	1 8.77	20 28 33.41
28	20 45 48.95	51.23	18 0 40.8	31.9	10.297	40.11	13 19.08	16 16.51	1 8.66	20 32 29.97
29	20 49 55.66	57.96	17 44 28.5	19.3	10.263	40.91	13 29.23	16 16.38	1 8.55	20 36 26.52
30	20 54 1.54	3.86	-17 27 57.2	47.7	10.229	+41.69	+13 38.55	16 16.24	1 8.43	20 40 23.07
31	20 58 6.60	8.94	17 10 67.3	57.5	10.195	42.46	13 47.05	16 16.10	1 8.32	20 44 19.63
Feb. 1	21 2 10.84	13.19	16 53 59.3	49.2	10.161	43.21	13 54.73	16 15.95	1 8.20	20 48 16.18
2	21 6 14.26	16.62	16 36 33.5	23.1	10.127	43.93	14 1.60	16 15.79	1 8.09	20 52 12.73
3	21 10 16.88	19.25	16 18 50.3	39.7	10.093	44.65	14 7.66	16 15.62	1 7.97	20 56 9.28
4	21 14 18.70	21.08	-16 0 50.2	39.4	10.059	+45.35	+14 12.90	16 15.45	1 7.85	21 0 5.84
5	21 18 19.72	22.11	15 42 33.6	22.6	10.026	46.09	14 17.35	16 15.28	1 7.73	21 4 2.39
6	21 22 19.94	22.33	15 23 60.8	49.6	9.993	46.69	14 21.02	16 15.11	1 7.62	21 7 58.95
7	21 26 19.39	21.78	15 5 12.2	0.8	9.961	47.33	14 23.90	16 14.93	1 7.50	21 11 55.50
8	21 30 18.07	20.46	14 45 68.3	56.8	9.929	47.96	14 26.02	16 14.75	1 7.39	21 15 52.05
9	21 34 15.98	18.37	-14 26 49.5	37.8	9.897	+48.58	+14 27.37	16 14.56	1 7.28	21 19 48.61
10	21 38 13.12	15.50	14 7 16.2	4.3	9.865	49.17	14 27.95	16 14.37	1 7.17	21 23 45.17
11	21 42 9.49	11.86	13 47 28.9	16.9	9.833	49.75	14 27.77	16 14.18	1 7.06	21 27 41.72
12	21 46 5.11	7.47	13 27 27.9	15.8	9.802	50.31	14 26.83	16 13.98	1 6.95	21 31 38.27
13	21 49 59.99	62.34	13 7 13.8	1.6	9.771	50.85	14 25.15	16 13.78	1 6.84	21 35 34.82
14	21 53 54.13	56.47	-12 46 46.9	34.6	9.740	+51.38	+14 22.73	16 13.58	1 6.73	21 39 31.38
15	21 57 47.54	49.87	-12 25 67.6	55.2	9.711	+51.88	+14 19.58	16 13.37	1 6.63	21 43 27.93

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.											
Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.	
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.					
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>s</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>'</sup> <sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	
Feb. 15	21 57 47.54	49.87	-12 25 67.6	55.2	9.711	+51.88	+14 19.58	16 13.37	1 6.63	21 43 27.93	
16	22 1 40.23	42.54	12 5 16.5	4.0	9.681	52.37	14 15.70	16 13.16	1 6.53	21 47 24.49	
17	22 5 32.21	34.50	11 44 13.9	1.3	9.651	52.84	14 11.12	16 12.95	1 6.43	21 51 21.04	
18	22 9 23.48	25.76	11 22 60.2	47.7	9.622	53.28	14 5.84	16 12.74	1 6.33	21 55 17.59	
19	22 13 14.06	16.32	11 1 35.9	23.4	9.593	53.72	13 59.85	16 12.53	1 6.23	21 59 14.15	
20	22 17 3.96	6.19	-10 39 61.5	49.0	9.565	+54.15	+13 53.20	16 12.32	1 6.13	22 3 10.70	
21	22 20 53.19	55.38	10 18 17.3	4.8	9.537	54.53	13 45.88	16 12.10	1 6.04	22 7 7.25	
22	22 24 41.76	43.92	9 56 23.7	11.2	9.510	54.92	13 37.90	16 11.88	1 5.95	22 11 3.80	
23	22 28 29.70	31.83	9 34 21.1	8.6	9.485	55.29	13 29.27	16 11.66	1 5.86	22 15 0.35	
24	22 32 17.02	19.12	9 11 70.0	57.5	9.460	55.63	13 20.03	16 11.44	1 5.77	22 18 56.91	
25	22 36 3.74	5.81	- 8 49 50.7	38.3	9.435	+55.97	+13 10.20	16 11.21	1 5.69	22 22 53.46	
26	22 39 49.88	51.92	8 27 23.6	11.3	9.411	56.28	12 59.78	16 10.98	1 5.61	22 26 50.01	
27	22 43 35.45	37.46	8 4 49.1	36.9	9.387	56.58	12 48.80	16 10.74	1 5.53	22 30 46.56	
28	22 47 20.48	22.45	7 41 67.6	55.5	9.366	56.87	12 37.27	16 10.50	1 5.46	22 34 43.12	
Mar. 1	22 51 4.99	6.92	7 19 19.4	7.5	9.345	57.14	12 25.22	16 10.26	1 5.39	22 38 39.67	
2	22 54 49.01	50.91	- 6 56 25.0	13.2	9.325	+57.39	+12 12.70	16 10.02	1 5.32	22 42 36.22	
3	22 58 32.56	34.42	6 33 24.7	13.1	9.305	57.63	11 59.70	16 9.76	1 5.25	22 46 32.77	
4	23 2 15.66	17.48	6 10 18.9	7.5	9.287	57.85	11 46.24	16 9.50	1 5.18	22 50 29.32	
5	23 5 58.33	60.11	5 46 68.0	56.8	9.269	58.06	11 32.35	16 9.24	1 5.12	22 54 25.87	
6	23 9 40.59	42.33	5 23 52.3	41.3	9.253	58.25	11 18.07	16 8.98	1 5.06	22 58 22.42	
7	23 13 22.47	24.17	- 5 0 32.2	21.4	9.237	+58.42	+11 3.39	16 8.72	1 5.00	23 2 18.98	
8	23 17 3.98	5.64	4 36 68.1	57.5	9.222	58.58	10 48.34	16 8.46	1 4.94	23 6 15.53	
9	23 20 45.14	46.76	4 13 40.4	30.0	9.208	58.72	10 32.95	16 8.19	1 4.89	23 10 12.08	
10	23 24 25.99	27.57	3 49 60.5	59.4	9.195	58.85	10 17.24	16 7.92	1 4.84	23 14 8.63	
11	23 28 6.54	8.07	3 26 35.7	25.9	9.183	58.96	10 1.24	16 7.65	1 4.80	23 18 5.19	
12	23 31 46.79	48.29	- 3 2 59.4	49.9	9.172	+59.06	+ 9 44.94	16 7.38	1 4.75	23 22 1.74	
13	23 35 26.76	28.21	2 39 21.1	11.8	9.161	59.13	9 28.36	16 7.11	1 4.71	23 25 58.30	
14	23 39 6.49	7.90	2 15 41.1	32.0	9.151	59.20	9 11.53	16 6.84	1 4.67	23 29 54.85	
15	23 42 45.99	47.36	1 51 59.7	50.9	9.141	59.25	8 54.48	16 6.57	1 4.63	23 33 51.40	
16	23 46 25.27	26.59	1 28 17.4	8.9	9.132	59.27	8 37.22	16 6.30	1 4.60	23 37 47.95	
17	23 50 4.34	5.61	- 1 4 34.6	26.4	9.124	+59.26	+ 8 19.74	16 6.03	1 4.57	23 41 44.50	
18	23 53 43.22	44.45	0 40 51.7	43.8	9.117	59.28	8 2.07	16 5.76	1 4.55	23 45 41.05	
19	23 57 21.94	23.12	- 0 17 9.0	1.4	9.110	59.26	7 44.24	16 5.49	1 4.53	23 49 37.60	
20	0 1 0.50	1.64	+ 0 6 33.1	40.4	9.104	59.23	7 26.24	16 5.22	1 4.51	23 53 34.16	
21	0 4 38.93	40.03	0 30 14.2	21.2	9.099	59.19	7 8.12	16 4.95	1 4.50	23 57 30.71	
22	0 8 17.25	18.30	+ 0 53 54.0	60.7	9.095	+59.13	+ 6 49.89	16 4.68	1 4.49	0 1 27.26	
23	0 11 55.47	56.47	1 17 32.0	38.4	9.091	59.05	6 31.57	16 4.41	1 4.48	0 5 23.81	
24	0 15 33.61	34.56	1 41 8.0	14.1	9.088	58.96	6 13.17	16 4.14	1 4.47	0 9 20.36	
25	0 19 11.70	12.60	2 4 41.6	47.4	9.086	58.84	5 54.71	16 3.87	1 4.47	0 13 16.91	
26	0 22 49.75	50.61	2 28 12.4	17.5	9.085	58.71	5 36.21	16 3.60	1 4.47	0 17 13.46	
27	0 26 27.79	28.60	+ 2 51 40.1	45.2	9.085	+58.58	+ 5 17.70	16 3.33	1 4.47	0 21 10.02	
28	0 30 5.85	6.61	3 15 4.4	9.2	9.086	58.43	4 59.20	16 3.06	1 4.47	0 25 6.58	
29	0 33 43.94	44.65	3 38 24.8	29.3	9.088	58.26	4 40.74	16 2.78	1 4.48	0 29 3.13	
30	0 37 22.08	22.74	4 1 41.1	45.3	9.091	58.09	4 22.34	16 2.50	1 4.49	0 32 59.68	
31	0 41 0.31	0.92	4 24 53.0	56.9	9.095	57.90	4 4.02	16 2.22	1 4.50	0 36 56.23	
32	0 44 38.64	39.21	+ 4 48 0.1	3.7	9.100	+57.69	+ 3 45.81	16 1.94	1 4.51	0 40 52.78	
33	0 48 17.10	17.63	+ 5 11 2.1	5.4	9.105	+57.47	+ 3 27.73	16 1.66	1 4.53	0 44 49.33	

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0°.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Apr. 1	0 44 38.64	39.21	+ 4 48 0.1	3.7	9.100	+57.69	+3 45.81	16 1.94	1 4.51	0 40 52.78
2	0 48 17.10	17.63	5 11 2.1	5.4	9.105	57.47	3 27.73	16 1.66	1 4.53	0 44 49.33
3	0 51 55.70	56.18	5 33 58.6	61.5	9.112	57.34	3 9.77	16 1.38	1 4.55	0 48 45.88
4	0 55 34.48	34.91	5 56 49.4	52.0	9.120	56.98	2 52.00	16 1.10	1 4.58	0 52 42.44
5	0 59 13.46	13.85	6 19 34.1	36.4	9.129	56.73	2 34.43	16 0.82	1 4.61	0 56 38.99
6	1 2 52.65	53.00	+ 6 42 12.3	14.3	9.138	+56.45	+2 17.07	16 0.54	1 4.64	1 0 35.54
7	1 6 32.06	32.36	7 4 43.8	45.6	9.148	56.16	1 59.94	16 0.26	1 4.67	1 4 32.09
8	1 10 11.72	11.98	7 27 8.1	9.7	9.158	55.85	1 43.06	15 59.98	1 4.71	1 8 28.64
9	1 13 51.65	51.87	7 49 25.0	26.3	9.169	55.54	1 26.44	15 59.70	1 4.75	1 12 25.19
10	1 17 31.87	32.05	8 11 34.0	35.1	9.183	55.21	1 10.11	15 59.42	1 4.79	1 16 21.74
11	1 21 12.38	12.52	+ 8 33 34.9	35.7	9.195	+54.86	+0 54.08	15 59.14	1 4.83	1 20 18.30
12	1 24 53.20	53.30	8 55 27.3	27.9	9.208	54.50	0 38.35	15 58.87	1 4.87	1 24 14.85
13	1 28 34.34	34.40	9 17 10.8	11.2	9.222	54.13	0 22.94	15 58.60	1 4.92	1 28 11.40
14	1 32 15.82	15.84	9 38 45.1	45.3	9.236	53.73	+0 7.87	15 58.33	1 4.97	1 32 7.95
15	1 35 57.65	57.63	10 0 9.9	9.9	9.250	53.33	-0 6.85	15 58.06	1 5.02	1 36 4.51
16	1 39 39.84	39.78	+10 21 24.8	24.6	9.265	+52.91	-0 21.22	15 57.80	1 5.08	1 40 1.07
17	1 43 22.39	22.29	10 42 29.4	29.0	9.281	52.47	0 35.22	15 57.54	1 5.13	1 43 57.62
18	1 47 5.32	5.19	11 3 23.4	22.8	9.297	52.02	0 48.84	15 57.28	1 5.19	1 47 54.17
19	1 50 48.65	48.48	11 24 6.4	5.6	9.314	51.56	1 2.07	15 57.03	1 5.25	1 51 50.73
20	1 54 32.38	32.18	11 44 38.2	37.2	9.331	51.08	1 14.89	15 56.78	1 5.31	1 55 47.28
21	1 58 16.52	16.29	+12 4 58.3	57.1	9.348	+50.58	-1 27.30	15 56.53	1 5.37	1 59 43.83
22	2 2 1.09	0.83	12 25 6.4	5.1	9.366	50.08	1 39.28	15 56.28	1 5.44	2 3 40.38
23	2 5 46.10	45.81	12 45 2.2	0.8	9.384	49.57	1 50.81	15 56.03	1 5.51	2 7 36.93
24	2 9 31.56	31.24	13 4 45.5	43.9	9.403	49.04	2 1.90	15 55.78	1 5.58	2 11 33.48
25	2 13 17.48	17.13	13 24 15.8	14.1	9.423	48.49	2 12.53	15 55.53	1 5.65	2 15 30.04
26	2 17 3.88	3.50	+13 43 32.9	31.0	9.443	+47.93	-2 22.69	15 55.29	1 5.72	2 19 26.59
27	2 20 50.77	50.36	14 2 36.4	34.4	9.464	47.36	2 32.35	15 55.05	1 5.80	2 23 23.15
28	2 24 38.16	37.73	14 21 26.0	23.9	9.486	46.77	2 41.51	15 54.81	1 5.88	2 27 19.70
29	2 28 26.07	25.62	14 39 61.5	59.3	9.508	46.18	2 50.15	15 54.57	1 5.96	2 31 16.25
30	2 32 14.51	14.04	14 58 22.5	20.2	9.530	45.57	2 58.27	15 54.33	1 6.04	2 35 12.80
May 1	2 36 3.49	3.00	+15 16 28.7	26.3	9.553	+44.95	-3 5.85	15 54.09	1 6.12	2 39 9.36
2	2 39 53.02	52.51	15 34 19.8	17.4	9.576	44.39	3 12.88	15 53.85	1 6.20	2 43 5.91
3	2 43 43.11	42.58	15 51 55.5	53.0	9.599	43.67	3 19.34	15 53.61	1 6.28	2 47 2.47
4	2 47 33.77	33.22	16 9 15.5	13.0	9.623	43.01	3 25.23	15 53.38	1 6.36	2 50 59.02
5	2 51 25.01	24.44	16 26 19.6	17.1	9.647	42.34	3 30.55	15 53.15	1 6.44	2 54 55.58
6	2 55 16.84	16.26	+16 43 7.3	4.8	9.671	+41.64	-3 35.28	15 52.92	1 6.52	2 58 52.14
7	2 59 9.25	8.66	16 59 38.4	35.9	9.695	40.95	3 39.43	15 52.69	1 6.60	3 2 48.69
8	3 3 2.24	1.64	17 15 52.6	50.1	9.720	40.24	3 42.99	15 52.47	1 6.68	3 6 45.24
9	3 6 55.83	55.22	17 31 49.7	47.2	9.745	39.51	3 45.96	15 52.26	1 6.76	3 10 41.80
10	3 10 50.01	49.39	17 47 29.2	26.7	9.770	38.78	3 48.34	15 52.05	1 6.84	3 14 38.36
11	3 14 44.78	44.15	+18 2 50.9	48.4	9.795	+38.04	-3 50.13	15 51.83	1 6.92	3 18 34.91
12	3 18 40.13	39.50	18 17 54.5	52.1	9.819	37.28	3 51.34	15 51.62	1 7.00	3 22 31.46
13	3 22 36.06	35.42	18 32 39.8	37.4	9.843	36.50	3 51.96	15 51.42	1 7.08	3 26 28.02
14	3 26 32.57	31.93	18 47 6.3	4.0	9.867	35.71	3 52.00	15 51.22	1 7.16	3 30 24.57
15	3 30 29.65	29.01	19 1 13.8	11.6	9.890	34.92	3 51.48	15 51.02	1 7.24	3 34 21.13
16	3 34 27.29	26.65	+19 15 2.1	0.0	9.913	+34.11	-3 50.40	15 50.83	1 7.33	3 38 17.69
17	3 38 25.48	24.84	+19 28 30.8	28.7	9.936	+33.26	-3 48.76	15 50.64	1 7.41	3 42 14.24

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0°.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
May 17	3 38 25.48	24.84	+19 28 30.8	28.7	9.936	+33.28	-3 48.76	15 50.64	1 7.41	3 42 14.94
18	3 42 24.21	23.58	19 41 39.7	37.6	9.959	32.45	3 46.58	15 50.46	1 7.49	3 46 10.79
19	3 46 23.48	22.85	19 54 28.5	26.4	9.981	31.61	3 43.87	15 50.28	1 7.57	3 50 7.35
20	3 50 23.28	22.66	20 6 56.9	55.0	10.003	30.76	3 40.63	15 50.10	1 7.65	3 54 3.90
21	3 54 23.60	22.99	20 19 4.7	2.9	10.094	29.89	3 36.87	15 49.93	1 7.73	3 58 0.46
22	3 58 24.44	23.84	+20 30 51.7	49.9	10.045	+29.02	-3 32.59	15 49.77	1 7.80	4 1 57.02
23	4 2 25.78	25.19	20 42 17.5	15.8	10.066	28.14	3 27.80	15 49.61	1 7.87	4 5 53.57
24	4 6 27.61	27.04	20 53 22.0	20.4	10.086	27.25	3 22.52	15 49.45	1 7.94	4 9 50.12
25	4 10 29.93	29.37	21 4 5.0	3.5	10.106	26.34	3 16.76	15 49.29	1 8.01	4 13 46.68
26	4 14 32.73	32.19	21 14 26.2	24.8	10.126	25.42	3 10.52	15 49.13	1 8.08	4 17 43.24
27	4 18 36.00	35.48	+21 24 25.3	24.0	10.145	+24.50	-3 3.81	15 48.98	1 8.15	4 21 39.80
28	4 22 39.72	39.22	21 34 2.2	1.0	10.164	23.57	2 56.64	15 48.84	1 8.21	4 25 36.35
29	4 26 43.89	43.41	21 43 16.8	15.7	10.183	22.63	2 49.02	15 48.69	1 8.27	4 29 32.90
30	4 30 48.51	48.05	21 52 8.8	7.8	10.201	21.69	2 40.97	15 48.55	1 8.33	4 33 29.46
31	4 34 53.57	53.13	22 0 38.0	37.1	10.219	20.74	2 32.47	15 48.40	1 8.39	4 37 26.02
June 1	4 38 59.04	58.63	+22 8 44.2	43.4	10.237	+19.77	-2 23.54	15 48.26	1 8.44	4 41 22.57
2	4 43 4.92	4.54	22 16 27.3	26.6	10.253	18.80	2 14.21	15 48.12	1 8.49	4 45 19.13
3	4 47 11.19	10.83	22 23 47.2	46.5	10.269	17.83	2 4.50	15 47.99	1 8.54	4 49 15.68
4	4 51 17.83	17.50	22 30 43.6	43.0	10.284	16.85	1 54.42	15 47.86	1 8.59	4 53 12.24
5	4 55 24.83	24.53	22 37 16.4	15.9	10.299	15.87	1 43.98	15 47.74	1 8.64	4 57 8.80
6	4 59 32.17	31.90	+22 43 25.5	25.1	10.313	+14.88	-1 33.20	15 47.62	1 8.69	5 1 5.36
7	5 3 39.83	39.59	22 49 10.7	10.4	10.326	13.89	1 22.10	15 47.51	1 8.73	5 5 1.91
8	5 7 47.79	47.58	22 54 31.9	31.6	10.337	12.89	1 10.69	15 47.40	1 8.77	5 8 58.47
9	5 11 56.03	55.86	22 59 29.0	28.7	10.348	11.88	0 59.00	15 47.29	1 8.80	5 12 55.02
10	5 16 4.52	4.38	23 4 1.9	1.7	10.358	10.87	0 47.07	15 47.19	1 8.83	5 16 51.58
11	5 20 13.23	13.12	+23 8 10.5	10.4	10.367	+9.85	-0 34.92	15 47.09	1 8.86	5 20 48.14
12	5 24 22.14	22.07	23 11 54.7	54.6	10.374	8.83	0 22.57	15 47.00	1 8.88	5 24 44.70
13	5 28 31.22	31.19	23 15 14.4	14.4	10.381	7.81	-0 10.04	15 46.91	1 8.90	5 28 41.25
14	5 32 40.45	40.46	23 18 9.5	9.5	10.387	6.78	+0 2.64	15 46.84	1 8.92	5 32 37.81
15	5 36 49.80	49.85	23 20 39.9	39.9	10.392	5.75	0 15.43	15 46.77	1 8.94	5 36 34.37
16	5 40 59.24	59.33	+23 22 45.7	45.7	10.395	+4.73	+0 28.31	15 46.70	1 8.95	5 40 30.93
17	5 45 8.75	8.87	23 24 26.8	26.8	10.397	3.70	0 41.27	15 46.63	1 8.96	5 44 27.48
18	5 49 18.30	18.45	23 25 43.1	43.1	10.398	2.67	0 54.28	15 46.57	1 8.97	5 48 24.04
19	5 53 27.87	28.06	23 26 34.6	34.6	10.399	1.63	1 7.29	15 46.52	1 8.97	5 52 20.59
20	5 57 37.43	37.66	23 27 1.3	1.3	10.398	+0.60	1 20.29	15 46.47	1 8.97	5 56 17.15
21	6 1 46.95	47.22	+23 27 3.2	3.2	10.395	-0.43	+1 33.25	15 46.42	1 8.97	6 0 13.71
22	6 5 56.41	56.72	23 28 40.3	40.3	10.392	1.46	1 46.16	15 46.38	1 8.97	6 4 10.26
23	6 10 5.80	6.14	23 29 52.6	52.6	10.389	2.50	1 58.99	15 46.34	1 8.96	6 8 6.82
24	6 14 15.10	15.48	23 24 40.2	40.1	10.385	3.53	2 11.73	15 46.31	1 8.95	6 12 3.38
25	6 18 24.27	24.69	23 23 3.0	2.9	10.380	4.56	2 24.35	15 46.29	1 8.93	6 15 59.94
26	6 22 33.30	33.76	+23 21 1.2	1.0	10.374	-5.59	+2 36.83	15 46.27	1 8.91	6 19 56.50
27	6 26 42.17	42.67	23 18 34.7	34.4	10.366	6.61	2 49.14	15 46.25	1 8.89	6 23 53.05
28	6 30 50.87	51.40	23 15 43.7	43.3	10.358	7.63	3 1.28	15 46.22	1 8.86	6 27 49.61
29	6 34 59.38	59.94	23 12 28.2	27.8	10.350	8.65	3 13.24	15 46.20	1 8.83	6 31 46.16
30	6 39 7.67	8.27	23 8 48.3	47.8	10.341	9.66	3 24.98	15 46.19	1 8.80	6 35 42.72
31	6 43 15.73	16.36	+23 4 44.1	43.5	10.331	-10.67	+3 36.49	15 46.18	1 8.76	6 39 39.28
32	6 47 23.55	24.21	+23 0 15.6	14.9	10.320	-11.67	+3 47.75	15 46.17	1 8.72	6 43 35.84

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.	
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.					
July	1	h m s 6 43-15.73	s 16.36	° ' " +23 4 44.1	" 43.5	s 10.331	" -10.67	m s +3 36.49	' " 15 46.18	m s 1 8.76	h m s 6 39 39.28
	2	6 47 23.55	24.21	23 0 15.6	14.9	10.330	11.67	3 47.75	15 46.17	1 8.72	6 43 35.84
	3	6 51 31.10	31.79	22 55 23.1	22.3	10.309	12.68	3 58.74	15 46.16	1 8.68	6 47 32.40
	4	6 55 38.36	39.08	22 50 6.6	5.7	10.286	13.68	4 9.44	15 46.16	1 8.64	6 51 28.95
	5	6 59 45.31	46.06	22 44 26.3	25.3	10.283	14.67	4 19.84	15 46.17	1 8.59	6 55 25.50
	6	7 3 51.94	52.72	+22 38 22.2	21.0	10.269	-15.66	+4 29.91	15 46.18	1 8.54	6 59 22.06
	7	7 7 58.22	59.02	22 31 54.6	53.3	10.254	16.64	4 39.63	15 46.19	1 8.49	7 3 18.62
	8	7 12 4.13	4.96	22 25 3.6	2.2	10.238	17.61	4 48.98	15 46.21	1 8.44	7 7 15.18
	9	7 16 9.65	10.50	22 17 49.3	47.8	10.221	18.58	4 57.95	15 46.24	1 8.38	7 11 11.73
	10	7 20 14.77	15.64	22 10 12.0	10.3	10.204	19.53	5 6.51	15 46.27	1 8.32	7 15 8.29
	11	7 24 19.46	20.35	+22 3 11.8	10.0	10.186	-20.48	+5 14.65	15 46.30	1 8.26	7 19 4.84
	12	7 28 23.71	24.62	21 53 48.8	46.9	10.167	21.42	5 22.34	15 46.34	1 8.20	7 23 1.40
	13	7 32 27.48	28.41	21 45 3.4	1.4	10.147	22.35	5 29.55	15 46.39	1 8.13	7 26 57.96
	14	7 36 30.77	31.72	21 35 55.8	53.6	10.127	23.28	5 36.28	15 46.44	1 8.06	7 30 54.52
	15	7 40 33.56	34.52	21 26 26.1	23.8	10.105	24.19	5 42.51	15 46.50	1 7.99	7 34 51.07
	16	7 44 35.82	36.80	+21 16 34.4	32.0	10.083	-25.10	+5 48.22	15 46.57	1 7.92	7 38 47.63
	17	7 48 37.55	38.54	21 6 21.1	18.5	10.061	26.00	5 53.39	15 46.64	1 7.84	7 42 44.18
	18	7 52 38.74	39.74	20 55 46.4	43.7	10.038	26.88	5 58.02	15 46.72	1 7.76	7 46 40.74
	19	7 56 39.37	40.38	20 44 50.6	47.8	10.014	27.76	6 2.09	15 46.80	1 7.68	7 50 37.30
	20	8 0 39.42	40.44	20 33 33.8	30.9	9.990	28.62	6 5.59	15 46.88	1 7.60	7 54 33.85
	21	8 4 38.89	39.92	+20 21 56.4	53.4	9.966	-29.48	+6 8.51	15 46.97	1 7.52	7 58 30.40
	22	8 8 37.78	38.81	20 9 58.5	55.4	9.942	30.33	6 10.84	15 47.06	1 7.44	8 2 26.96
	23	8 12 36.09	37.12	19 57 40.3	37.1	9.917	31.17	6 12.58	15 47.15	1 7.36	8 6 23.51
	24	8 16 33.80	34.83	19 44 62.2	58.9	9.893	32.00	6 13.74	15 47.25	1 7.28	8 10 20.07
	25	8 20 30.91	31.94	19 32 4.4	1.0	9.868	32.81	6 14.30	15 47.35	1 7.20	8 14 16.62
	26	8 24 27.42	28.45	+19 18 47.1	43.6	9.843	-33.62	+6 14.25	15 47.45	1 7.12	8 18 13.18
	27	8 28 23.34	24.36	19 5 10.6	7.0	9.818	34.43	6 13.60	15 47.56	1 7.03	8 22 9.74
	28	8 32 18.66	19.68	18 51 15.2	11.5	9.793	35.20	6 12.36	15 47.67	1 6.95	8 26 6.30
	29	8 36 13.39	14.40	18 36 61.1	57.3	9.768	35.97	6 10.53	15 47.78	1 6.86	8 30 2.86
	30	8 40 7.52	8.52	18 22 28.6	24.7	9.743	36.73	6 8.11	15 47.90	1 6.77	8 33 59.41
Aug.	31	8 44 1.06	2.05	+18 7 38.0	34.1	9.719	-37.48	+6 5.10	15 48.02	1 6.68	8 37 55.96
	1	8 47 54.01	54.99	17 52 29.6	25.7	9.694	38.22	6 1.49	15 48.14	1 6.60	8 41 52.52
	2	8 51 46.38	47.35	17 36 63.6	59.7	9.670	38.94	5 57.29	15 48.27	1 6.51	8 45 49.08
	3	8 55 38.16	39.11	17 21 20.3	16.4	9.645	39.65	5 52.52	15 48.40	1 6.42	8 49 45.63
	4	8 59 29.36	30.29	17 5 20.1	16.2	9.621	40.36	5 47.17	15 48.53	1 6.33	8 53 42.18
	5	9 3 19.99	20.90	+16 48 63.2	59.3	9.597	-41.06	+5 41.25	15 48.67	1 6.25	8 57 38.73
	6	9 7 10.04	10.93	16 32 29.9	26.0	9.573	41.73	5 34.75	15 48.81	1 6.16	9 1 35.28
	7	9 10 59.51	60.38	16 15 40.6	36.7	9.549	42.40	5 27.66	15 48.95	1 6.08	9 5 31.84
	8	9 14 48.40	49.25	15 58 35.5	31.7	9.525	43.06	5 19.99	15 49.10	1 5.99	9 9 28.39
	9	9 18 36.72	37.55	15 41 15.0	11.2	9.501	43.69	5 11.75	15 49.25	1 5.91	9 13 24.94
	10	9 22 24.48	25.28	+15 23 39.3	35.6	9.478	-44.30	+5 2.95	15 49.41	1 5.83	9 17 21.50
	11	9 26 11.67	12.44	15 5 48.8	45.1	9.454	44.91	4 53.58	15 49.59	1 5.74	9 21 18.06
	12	9 29 58.30	59.04	14 47 43.9	40.3	9.431	45.50	4 43.65	15 49.76	1 5.66	9 25 14.62
	13	9 33 44.37	45.08	14 20 24.0	21.4	9.408	46.08	4 33.17	15 49.94	1 5.58	9 29 11.17
	14	9 37 29.88	30.56	14 10 52.0	48.6	9.385	46.65	4 22.13	15 50.11	1 5.50	9 33 7.72
	15	9 41 14.85	15.50	+13 52 5.6	2.3	9.362	-47.21	+4 10.54	15 50.30	1 5.42	9 37 4.28
16	9 44 59.28	59.90	+13 33 6.1	2.9	9.340	-47.75	+3 58.42	15 50.49	1 5.35	9 41 0.83	

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
Aug. 16	<sup>h</sup> 9 <sup>m</sup> 44 <sup>s</sup> 59.28	59.90	<sup>°</sup> +13 <sup>'</sup> 33 <sup>"</sup> 6.1	2.9	9.340	-47.75	+ 3 58.42	15 50.49	1 5.35	9 41 0.83
17	9 48 43.18	43.77	13 13 53.6	50.5	9.319	48.98	3 45.77	15 50.68	1 5.28	9 44 57.38
18	9 52 26.56	27.11	12 54 28.6	25.7	9.308	48.80	3 39.60	15 50.88	1 5.21	9 48 53.93
19	9 56 9.43	9.94	12 34 51.4	48.6	9.377	48.30	3 18.91	15 51.08	1 5.14	9 52 50.49
20	9 59 51.79	52.26	12 14 62.3	59.7	9.356	49.79	3 4.72	15 51.28	1 5.07	9 56 47.04
21	10 3 33.68	34.11	+11 54 61.5	59.1	9.236	-50.96	+ 2 50.05	15 51.48	1 5.00	10 0 43.60
22	10 7 15.10	15.49	11 34 49.5	47.3	9.216	50.73	2 34.92	15 51.69	1 4.94	10 4 40.15
23	10 10 56.07	56.42	11 14 26.5	24.5	9.197	51.18	2 19.34	15 51.89	1 4.87	10 8 36.71
24	10 14 36.60	36.91	10 53 52.8	51.0	9.179	51.69	2 3.32	15 52.10	1 4.81	10 12 33.26
25	10 18 16.71	16.98	10 33 8.7	7.1	9.163	52.05	1 46.88	15 52.31	1 4.75	10 16 29.81
26	10 21 56.43	56.66	+10 12 14.5	13.1	9.147	-52.47	+ 1 30.04	15 52.53	1 4.69	10 20 26.36
27	10 25 35.77	35.96	9 51 10.6	9.4	9.132	52.86	1 12.83	15 52.75	1 4.63	10 24 22.91
28	10 29 14.76	14.90	9 29 57.2	56.3	9.117	53.25	0 55.27	15 52.97	1 4.58	10 28 19.46
29	10 32 53.40	53.50	9 8 34.7	34.1	9.103	53.62	0 37.37	15 53.19	1 4.53	10 32 16.02
30	10 36 31.72	31.77	8 47 3.4	3.1	9.090	53.99	0 19.15	15 53.41	1 4.48	10 36 12.57
31	10 40 9.74	9.74	+ 8 25 23.5	23.5	9.078	-54.33	+ 0 0.62	15 53.63	1 4.43	10 40 9.12
Sept. 1	10 43 47.47	47.42	8 3 35.4	35.7	9.067	54.67	- 0 18.20	15 53.86	1 4.39	10 44 5.67
2	10 47 24.93	24.84	7 41 39.4	40.0	9.056	55.00	0 37.30	15 54.08	1 4.35	10 48 2.23
3	10 51 2.14	2.00	7 19 35.9	36.8	9.045	55.30	0 56.63	15 54.31	1 4.31	10 51 58.78
4	10 54 39.12	38.93	6 57 25.1	26.3	9.036	55.60	1 16.19	15 54.54	1 4.27	10 55 55.33
5	10 58 15.88	15.64	+ 6 35 7.4	8.9	9.027	-55.88	- 1 35.97	15 54.78	1 4.23	10 59 51.88
6	11 1 52.44	52.15	6 12 43.1	44.9	9.019	56.14	1 55.96	15 55.02	1 4.20	11 3 48.44
7	11 5 28.82	28.48	5 50 12.6	14.7	9.012	56.39	2 16.14	15 55.27	1 4.17	11 7 44.99
8	11 9 5.02	4.63	5 27 36.3	38.7	9.006	56.63	2 36.49	15 55.51	1 4.15	11 11 41.54
9	11 12 41.06	40.62	5 4 54.4	57.2	8.999	56.85	2 56.99	15 55.76	1 4.13	11 15 38.09
10	11 16 16.96	16.47	+ 4 42 7.3	10.5	8.993	-57.06	- 3 17.64	15 56.01	1 4.11	11 19 34.64
11	11 19 52.74	52.20	4 19 15.4	18.9	8.988	57.26	3 38.41	15 56.27	1 4.09	11 23 31.19
12	11 23 28.40	27.81	3 56 19.0	22.9	8.984	57.44	3 59.29	15 56.53	1 4.08	11 27 27.74
13	11 27 3.97	3.32	3 33 18.4	22.6	8.980	57.60	4 20.27	15 56.79	1 4.07	11 31 24.29
14	11 30 39.46	38.76	3 10 13.9	18.5	8.978	57.76	4 41.32	15 57.05	1 4.06	11 35 20.85
15	11 34 14.89	14.14	+ 2 47 6.0	10.9	8.976	-57.90	- 5 2.44	15 57.32	1 4.06	11 39 17.41
16	11 37 50.27	49.47	2 23 55.0	60.3	8.975	58.08	5 23.60	15 57.59	1 4.06	11 43 13.96
17	11 41 25.64	24.78	2 0 41.2	46.8	8.974	58.23	5 44.78	15 57.86	1 4.06	11 47 10.51
18	11 45 1.01	0.10	1 37 24.9	30.8	8.974	58.33	6 5.97	15 58.13	1 4.06	11 51 7.06
19	11 48 36.39	35.43	1 14 6.4	12.7	8.975	58.30	6 27.13	15 58.40	1 4.07	11 55 3.61
20	11 52 11.82	10.81	+ 0 50 46.2	52.9	8.978	-58.37	- 6 48.25	15 58.67	1 4.08	11 59 0.16
21	11 55 47.31	46.24	0 27 24.5	31.5	8.981	58.43	7 9.30	15 58.95	1 4.09	12 2 56.71
22	11 59 22.89	21.77	+ 0 4 1.6	9.0	8.985	58.48	7 30.28	15 59.22	1 4.10	12 6 53.27
23	12 2 58.58	57.41	- 0 19 22.1	14.4	8.990	58.50	7 51.13	15 59.49	1 4.12	12 10 49.82
24	12 6 34.41	33.19	0 42 46.2	38.2	8.996	58.52	8 11.85	15 59.76	1 4.15	12 14 46.37
25	12 10 10.40	9.12	- 1 6 10.5	2.1	9.004	-58.52	- 8 32.40	16 0.04	1 4.18	12 18 42.92
26	12 13 46.58	45.25	1 29 34.7	26.0	9.012	58.50	8 52.77	16 0.31	1 4.21	12 22 39.47
27	12 17 22.97	21.59	1 52 58.4	49.4	9.021	58.47	9 12.93	16 0.58	1 4.24	12 26 36.02
28	12 20 59.59	58.16	2 16 21.2	11.9	9.031	58.43	9 32.86	16 0.85	1 4.27	12 30 32.57
29	12 24 36.47	34.98	2 39 42.9	33.3	9.043	58.38	9 52.53	16 1.12	1 4.31	12 34 29.13
30	12 28 13.62	12.08	- 3 2 63.1	53.2	9.055	-58.30	-10 11.93	16 1.39	1 4.35	12 38 25.68
31	12 31 51.09	49.49	- 3 26 21.4	11.2	9.068	-58.22	-10 31.02	16 1.66	1 4.39	12 42 22.23

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.



## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Oct. 1	12 31 51.09	49.49	- 3 26 21.4	11.2	9.068	-58.69	-10 31.02	16 1.66	1 4.39	12 42 22.23
2	12 35 28.86	27.22	3 49 37.5	27.0	9.069	58.12	10 49.79	16 1.93	1 4.43	12 46 18.78
3	12 39 6.98	5.29	4 12 51.1	40.3	9.066	58.00	11 8.22	16 2.20	1 4.48	12 50 15.33
4	12 42 45.47	43.73	4 35 61.8	50.7	9.111	57.87	11 26.28	16 2.47	1 4.53	12 54 11.88
5	12 46 24.34	22.55	4 58 69.1	57.8	9.127	57.73	11 43.95	16 2.74	1 4.59	12 58 8.44
6	12 50 3.59	1.75	- 5 22 12.8	1.3	9.143	-57.56	-12 1.25	16 3.01	1 4.65	13 2 4.99
7	12 53 43.24	41.36	5 45 12.4	0.7	9.161	57.39	12 18.15	16 3.29	1 4.71	13 6 1.54
8	12 57 23.31	21.39	6 7 67.6	55.7	9.179	57.20	12 34.63	16 3.56	1 4.77	13 9 58.09
9	13 1 3.94	1.87	6 30 57.9	45.8	9.196	56.99	12 50.66	16 3.84	1 4.84	13 13 54.64
10	13 4 44.83	42.81	6 53 43.1	30.8	9.218	56.77	13 6.23	16 4.12	1 4.91	13 17 51.20
11	13 8 26.29	24.23	- 7 16 22.7	10.2	9.236	-56.52	-13 21.32	16 4.40	1 4.98	13 21 47.75
12	13 12 8.24	6.14	7 38 56.3	43.6	9.259	56.36	13 35.91	16 4.68	1 5.06	13 25 44.30
13	13 15 50.69	48.55	8 1 23.4	10.6	9.281	55.99	13 50.02	16 4.96	1 5.14	13 29 40.85
14	13 19 33.66	31.48	8 23 43.8	30.8	9.303	55.70	14 3.60	16 5.24	1 5.22	13 33 37.41
15	13 23 17.17	14.95	8 45 57.1	44.0	9.325	55.39	14 16.66	16 5.52	1 5.30	13 37 33.96
16	13 26 61.23	58.97	- 9 7 62.8	49.6	9.348	-55.06	-14 29.15	16 5.80	1 5.38	13 41 30.51
17	13 30 45.86	43.56	9 29 60.5	47.2	9.372	54.72	14 41.08	16 6.08	1 5.47	13 45 27.06
18	13 34 31.08	28.74	9 51 49.9	36.5	9.397	54.37	14 52.41	16 6.36	1 5.56	13 49 23.62
19	13 38 16.91	14.54	10 13 30.6	17.1	9.423	54.00	15 3.14	16 6.63	1 5.65	13 53 20.17
20	13 42 3.36	0.96	10 34 62.2	48.6	9.449	53.62	15 13.25	16 6.91	1 5.74	13 57 16.72
21	13 45 50.45	48.02	-10 56 24.4	10.8	9.476	-53.22	-15 22.72	16 7.18	1 5.84	14 1 13.27
22	13 49 38.20	35.74	11 17 36.7	23.0	9.504	52.80	15 31.54	16 7.45	1 5.94	14 5 9.83
23	13 53 26.64	24.15	11 38 38.7	25.0	9.532	52.36	15 39.69	16 7.71	1 6.04	14 9 6.38
24	13 57 15.77	13.26	11 59 30.1	16.4	9.560	51.91	15 47.11	16 7.98	1 6.14	14 13 2.94
25	14 1 5.63	3.09	12 19 70.5	56.8	9.583	51.45	15 53.79	16 8.24	1 6.25	14 16 59.49
26	14 4 56.22	53.66	-12 40 39.5	25.8	9.624	-50.96	-15 59.76	16 8.49	1 6.35	14 20 56.04
27	14 8 47.57	44.99	13 0 56.7	43.1	9.655	50.46	16 4.97	16 8.74	1 6.46	14 24 52.59
28	14 12 39.68	37.08	13 20 61.8	48.3	9.687	49.95	16 9.42	16 8.99	1 6.57	14 28 49.14
29	14 16 32.57	29.95	13 40 54.4	41.0	9.720	49.43	16 13.09	16 9.24	1 6.68	14 32 45.70
30	14 20 26.25	23.61	14 0 34.0	20.7	9.753	48.87	16 15.97	16 9.49	1 6.79	14 36 42.26
31	14 24 20.74	18.08	-14 19 60.1	46.9	9.787	-48.31	-16 18.04	16 9.73	1 6.90	14 40 38.81
Nov. 1	14 28 16.05	13.38	14 38 72.5	59.4	9.821	47.79	16 19.30	16 9.97	1 7.01	14 44 35.36
2	14 32 12.18	9.50	14 57 70.8	57.9	9.856	47.13	16 19.74	16 10.21	1 7.13	14 48 31.91
3	14 36 9.14	6.45	15 16 54.5	41.8	9.890	46.51	16 19.35	16 10.45	1 7.25	14 52 28.47
4	14 40 6.93	4.23	15 35 23.2	10.7	9.925	45.87	16 18.12	16 10.69	1 7.37	14 56 25.03
5	14 44 5.56	2.86	-15 53 36.5	24.2	9.960	-45.22	-16 16.05	16 10.93	1 7.49	15 0 21.58
6	14 48 5.03	2.33	16 11 33.9	21.8	9.995	44.55	16 13.14	16 11.16	1 7.61	15 4 18.13
7	14 52 5.34	2.64	16 29 15.1	3.3	10.030	43.87	16 9.40	16 11.39	1 7.73	15 8 14.69
8	14 56 6.49	3.79	16 46 39.6	28.1	10.065	43.17	16 4.81	16 11.62	1 7.85	15 12 11.24
9	15 0 8.48	5.79	17 3 46.9	35.7	10.100	42.44	15 59.38	16 11.85	1 7.97	15 16 7.80
10	15 4 11.32	8.63	-17 20 36.8	25.8	10.135	-41.71	-15 53.11	16 12.08	1 8.09	15 20 4.36
11	15 8 14.98	12.31	17 36 68.8	58.1	10.170	40.96	15 46.01	16 12.31	1 8.21	15 24 0.91
12	15 12 19.48	16.82	17 53 22.4	12.0	10.204	40.18	15 38.07	16 12.53	1 8.33	15 27 57.46
13	15 16 24.81	22.16	18 9 17.3	7.2	10.239	39.39	15 29.30	16 12.75	1 8.45	15 31 54.01
14	15 20 30.97	28.34	18 24 53.0	43.2	10.274	38.58	15 19.70	16 12.97	1 8.57	15 35 50.57
15	15 24 37.96	35.35	-18 39 69.2	59.7	10.308	-37.75	-15 9.28	16 13.19	1 8.68	15 39 47.13
16	15 28 45.76	43.18	18 54 65.5	56.3	10.342	-36.92	-14 58.04	16 13.41	1 8.79	15 43 43.68

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0°.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>s</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>'</sup> <sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Nov. 16	15 28 45.76	43.18	-18 54 65.5	56.3	10.342	-36.93	-14 58.04	16 13.41	1 8.79	15 43 43.68
17	15 32 54.37	51.82	19 9 41.5	32.6	10.376	36.07	14 45.98	16 13.62	1 8.91	15 47 40.24
18	15 37 3.80	1.28	19 23 56.8	43.3	10.410	35.90	14 33.12	16 13.82	1 9.02	15 51 36.79
19	15 41 14.04	11.55	19 37 51.0	42.8	10.444	34.32	14 19.44	16 14.01	1 9.14	15 55 33.35
20	15 45 25.09	22.63	19 51 23.8	16.0	10.477	33.42	14 4.96	16 14.21	1 9.25	15 59 29.90
21	15 49 36.93	34.51	-20 4 34.9	27.4	10.510	-32.50	-13 49.68	16 14.40	1 9.36	16 3 26.46
22	15 53 49.57	47.19	20 17 23.9	16.8	10.543	31.57	13 33.60	16 14.59	1 9.47	16 7 23.01
23	15 58 2.90	0.65	20 29 50.4	43.6	10.576	30.63	13 16.73	16 14.77	1 9.58	16 11 19.56
24	16 2 17.19	14.90	20 41 54.1	47.7	10.608	29.67	12 59.09	16 14.95	1 9.69	16 15 16.12
25	16 6 32.16	29.92	20 53 34.7	23.6	10.640	28.70	12 40.68	16 15.12	1 9.80	16 19 12.68
26	16 10 47.88	45.69	-21 4 51.9	46.2	10.671	-27.72	-12 21.50	16 15.28	1 9.90	16 23 9.23
27	16 15 4.35	2.21	21 15 45.3	39.9	10.701	26.73	12 1.60	16 15.44	1 10.00	16 27 5.79
28	16 19 21.54	19.45	21 26 14.6	9.6	10.731	25.72	11 40.97	16 15.60	1 10.09	16 31 2.34
29	16 23 39.44	37.41	21 36 19.6	14.9	10.760	24.69	11 19.63	16 15.75	1 10.18	16 34 58.90
30	16 27 58.04	56.07	21 45 59.9	55.6	10.789	23.66	10 57.60	16 15.90	1 10.27	16 38 55.46
Dec. 1	16 32 17.30	15.39	-21 55 15.2	11.3	10.816	-22.62	-10 34.88	16 16.04	1 10.36	16 42 52.01
2	16 36 37.92	35.37	22 4 5.3	1.7	10.842	21.56	10 11.52	16 16.18	1 10.44	16 46 48.57
3	16 40 57.75	55.97	22 12 29.8	26.5	10.867	20.49	9 47.54	16 16.32	1 10.52	16 50 45.13
4	16 45 18.88	17.17	22 20 28.6	25.6	10.892	19.41	9 22.97	16 16.45	1 10.59	16 54 41.68
5	16 49 40.57	38.93	22 27 61.4	58.7	10.915	18.32	8 57.84	16 16.58	1 10.66	16 58 38.24
6	16 54 2.80	1.23	-22 35 7.9	5.5	10.938	-17.22	- 8 32.16	16 16.71	1 10.73	17 2 34.80
7	16 58 25.54	24.05	22 41 47.8	45.6	10.956	16.10	8 5.96	16 16.84	1 10.80	17 6 31.36
8	17 2 48.75	47.35	22 47 61.0	59.0	10.976	14.99	7 39.30	16 16.96	1 10.86	17 10 27.91
9	17 7 12.40	11.08	22 53 47.3	45.6	10.994	13.86	7 12.20	16 17.07	1 10.92	17 14 24.47
10	17 11 36.47	35.22	22 59 6.5	5.0	11.010	12.73	6 44.69	16 17.18	1 10.98	17 18 21.02
11	17 15 60.90	59.74	-23 3 58.3	57.0	11.025	-11.59	- 6 16.80	16 17.29	1 11.03	17 22 17.58
12	17 20 25.67	24.60	23 8 22.6	21.5	11.039	10.45	5 48.58	16 17.39	1 11.07	17 26 14.14
13	17 24 50.75	49.76	23 12 19.4	18.4	11.050	9.30	5 20.06	16 17.49	1 11.12	17 30 10.70
14	17 29 16.11	15.21	23 15 48.4	47.6	11.061	8.13	4 51.24	16 17.59	1 11.16	17 34 7.26
15	17 33 41.71	40.90	23 18 49.5	48.9	11.071	6.96	4 22.18	16 17.68	1 11.19	17 38 3.81
16	17 38 7.52	6.80	-23 21 22.6	22.1	11.079	- 5.79	- 3 52.92	16 17.77	1 11.22	17 42 0.37
17	17 42 33.51	32.88	23 23 27.6	27.3	11.086	4.62	3 23.49	16 17.85	1 11.24	17 45 56.93
18	17 46 59.64	59.10	23 25 4.5	4.3	11.092	3.45	2 53.89	16 17.92	1 11.26	17 49 53.48
19	17 51 25.90	25.45	23 26 13.2	13.1	11.096	2.27	2 24.18	16 17.99	1 11.28	17 53 50.04
20	17 55 52.24	51.88	23 26 53.6	53.6	11.098	- 1.09	1 54.39	16 18.05	1 11.29	17 57 46.60
21	18 0 18.62	18.35	-23 27 5.7	5.7	11.100	+ 0.08	- 1 24.55	16 18.11	1 11.30	18 1 43.15
22	18 4 45.02	44.85	23 26 49.6	49.6	11.101	1.26	0 54.69	16 18.17	1 11.30	18 5 39.71
23	18 9 11.44	11.36	23 26 5.2	5.2	11.100	2.44	- 0 24.82	16 18.21	1 11.30	18 9 36.26
24	18 13 37.85	37.86	23 24 52.5	52.5	11.098	3.62	+ 0 5.04	16 18.25	1 11.29	18 13 32.82
25	18 16 4.19	4.29	23 23 11.5	11.5	11.095	4.80	0 34.83	16 18.28	1 11.28	18 17 29.38
26	18 22 30.42	30.62	-23 21 2.3	2.2	11.091	+ 5.97	+ 1 4.50	16 18.30	1 11.26	18 21 25.94
27	18 26 56.52	56.81	23 18 25.0	24.8	11.085	7.14	1 34.05	16 18.32	1 11.23	18 25 22.50
28	18 31 22.47	22.85	23 15 19.6	19.3	11.077	8.30	2 3.46	16 18.34	1 11.20	18 29 19.06
29	18 35 48.23	48.70	23 11 46.2	45.8	11.068	9.46	2 32.68	16 18.35	1 11.17	18 33 15.61
30	18 40 13.77	14.33	23 7 44.9	44.4	11.058	10.62	3 1.67	16 18.36	1 11.14	18 37 12.16
31	18 44 39.05	39.70	-23 3 15.9	15.3	11.046	+11.77	+ 3 30.41	16 18.36	1 11.10	18 41 8.72
32	18 49 4.04	4.77	-22 58 19.3	18.6	11.034	+12.23	+ 3 58.84	16 18.35	1 11.06	18 45 5.28

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	"	"	
Jan. 0	12 1.45	2.610	6 45 31.64	166.96	+18 1 29.6	-182.0	73.71	16 44.8	61 21.2	I. II. S.
1	13 3.12	2.517	7 51 18.85	161.32	16 8 19.0	-377.1	72.41	16 38.6	60 58.6	II. S.
2	14 1.91	2.377	8 54 12.29	152.88	13 6 19.2	-523.6	70.45	16 27.4	60 17.2	II. S.
3	14 57.15	2.298	9 53 32.32	143.87	9 17 0.5	-613.7	68.33	16 12.7	59 22.7	II. S.
4	15 48.97	2.096	10 49 26.51	135.92	5 2 11.4	-652.6	66.40	15 56.1	58 22.4	II. S.
5	16 37.98	1.994	11 42 31.40	129.83	+ 0 40 23.0	-650.4	64.90	15 39.6	57 21.8	II. S.
6	17 24.97	1.928	12 33 35.42	125.85	- 3 34 2.9	-617.3	63.90	15 24.3	56 25.7	II. S.
7	18 10.77	1.894	13 23 23.64	123.81	- 7 30 18.0	-560.5	63.37	15 11.1	55 37.1	II. S.
8	18 56.10	1.888	14 12 51.63	123.43	-10 50 58.5	-485.1	63.25	15 0.5	54 58.0	II. S.
9	19 41.54	1.901	15 2 21.90	124.25	-13 56 8.3	-383.3	63.42	14 52.6	54 29.0	II. S.
10	20 27.46	1.926	15 52 21.30	125.76	-16 12 43.6	-287.4	63.76	14 47.4	54 9.9	II. S.
11	21 14.03	1.953	16 42 55.49	127.38	-17 44 28.1	-169.6	64.11	14 44.6	53 59.8	II. S.
12	22 1.18	1.973	17 34 12.72	129.61	-18 27 11.5	- 43.1	64.35	14 44.1	53 58.0	II. S.
13	22 48.66	1.981	18 25 46.10	129.03	-18 18 24.7	+ 87.1	64.41	14 45.5	54 3.1	II. S.
14	23 36.14	1.973	19 17 18.91	128.56	-17 17 54.5	214.5	64.25	14 48.5	54 14.1	II. S.
16	0 23.27	1.953	20 8 31.38	127.38	-15 28 0.4	+323.0	63.94	14 52.8	54 30.0	I. S.
17	1 9.87	1.930	20 59 11.43	125.94	-12 53 29.0	436.7	63.58	14 58.3	54 50.2	I. S.
18	1 55.93	1.910	21 49 18.83	124.77	- 9 41 7.5	521.5	63.32	15 4.9	55 14.5	I. S.
19	2 41.66	1.904	22 39 6.93	124.42	- 5 50 10.2	584.4	63.29	15 12.7	55 42.9	I. S.
20	3 27.50	1.920	23 29 1.54	125.38	- 1 56 55.4	622.7	63.60	15 21.5	56 15.2	I. S.
21	4 14.05	1.964	0 19 38.84	126.02	+ 2 15 20.4	+633.9	64.35	15 31.5	56 51.8	I. S.
22	5 2.03	2.039	1 11 41.70	126.52	6 26 9.9	614.7	65.56	15 42.5	57 32.4	I. S.
23	5 52.16	2.144	2 5 54.74	128.83	10 22 23.1	580.0	67.17	15 54.3	58 15.6	I. S.
24	6 45.00	2.270	3 2 55.88	146.41	13 48 45.0	464.7	69.02	16 6.0	58 58.8	I. S.
25	7 41.14	2.389	4 3 4.37	154.19	16 28 12.6	325.4	70.87	16 17.7	59 41.5	I. S.
26	8 40.05	2.503	5 6 5.24	160.48	+18 3 39.9	+146.1	72.31	16 27.2	60 16.4	I. S.
27	9 40.88	2.554	6 11 1.44	163.55	18 21 38.3	- 58.6	72.95	16 33.5	60 39.6	I. N. S.
28	10 42.11	2.535	7 16 21.66	162.42	17 16 47.0	-263.3	72.64	16 35.5	60 47.1	I. N. S.
29	11 42.11	2.456	8 20 28.55	157.62	14 54 41.3	-440.4	71.47	16 32.6	60 36.4	I. N. S.
30	12 39.71	2.340	9 22 10.12	150.63	11 30 44.2	-570.3	69.81	16 24.9	60 8.0	II. S.
31	13 34.37	2.216	10 20 55.47	143.19	+ 7 25 44.7	-645.6	68.02	16 13.1	59 21.9	II. S.
Feb. 1	14 26.20	2.107	11 16 50.57	136.60	+ 3 1 5.0	-669.9	66.43	15 58.8	58 32.2	II. S.
2	15 15.69	2.022	12 10 24.57	131.51	- 1 24 35.6	-652.3	65.20	15 43.3	57 35.5	II. S.
3	16 3.48	1.965	13 2 16.55	128.11	- 5 36 33.3	-602.9	64.39	15 28.2	56 39.9	II. S.
4	16 50.24	1.935	13 52 37.75	126.29	- 9 23 44.8	-529.7	63.97	15 14.6	55 49.8	II. S.
5	17 36.55	1.927	14 43 28.85	125.79	-12 37 57.1	-438.7	63.86	15 3.2	55 8.1	II. S.
6	18 22.85	1.933	15 33 51.14	126.90	-15 12 54.5	-333.9	63.97	14 54.6	54 36.6	II. S.
7	19 9.43	1.949	16 24 30.18	127.10	-17 3 41.8	-218.3	64.18	14 49.4	54 15.9	II. S.
8	19 56.40	1.965	17 14 32.33	128.04	-18 6 31.3	- 94.6	64.38	14 46.4	54 6.2	II. S.
9	20 43.69	1.975	18 6 54.03	128.68	-18 18 49.9	+ 33.6	64.47	14 46.4	54 6.5	II. S.
10	21 31.12	1.976	18 58 21.50	128.77	-17 39 38.6	+162.0	64.42	14 49.0	54 15.9	II. N. S.
11	22 18.48	1.968	19 49 50.24	129.30	-16 9 56.2	285.2	64.23	14 53.6	54 32.7	II. N. S.
12	23 5.57	1.955	20 41 0.17	127.50	-13 52 55.2	397.6	63.97	14 59.7	54 55.1	II. N. S.
13	23 52.34	1.942	21 31 50.13	126.71	-10 54 4.1	493.5	63.74	15 6.9	55 21.8	II. N. S.
15	0 38.86	1.937	22 22 25.05	126.36	- 7 20 58.4	+567.9	63.65	15 14.8	55 50.6	I. S.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Feb. 15	0 38.86	1.937	22 22 25.65	126.36	- 7 20 58.4	+567.9	63.65	15 14.8	55 50.6	I. S.
16	1 25.40	1.945	23 13 2.62	126.88	- 3 23 3.9	617.1	63.81	15 22.9	56 20.5	I. S.
17	2 12.39	1.974	0 4 6.10	126.82	+ 0 48 44.1	636.7	64.31	15 31.3	56 51.1	I. S.
18	3 0.34	2.026	0 56 7.74	131.74	5 1 51.1	624.0	65.18	15 39.5	57 21.5	I. S.
19	3 49.83	2.102	1 49 41.76	136.30	9 3 11.8	576.3	66.38	15 47.6	57 51.2	I. S.
20	4 41.37	2.196	2 45 18.99	141.24	+12 37 59.4	+491.0	67.85	15 55.5	58 20.2	I. S.
21	5 35.27	2.296	3 43 18.45	148.00	15 30 55.9	367.5	69.37	16 3.1	58 48.0	I. S.
22	6 31.49	2.385	4 43 37.68	153.38	17 27 19.9	209.2	70.67	16 9.9	59 13.1	I. S.
23	7 29.52	2.443	5 45 45.56	156.86	18 14 55.8	+ 25.7	71.47	16 15.6	59 34.0	I. S.
24	8 28.40	2.454	6 48 44.00	157.50	17 46 44.1	-166.5	71.56	16 19.4	59 47.8	I. N. S.
25	9 26.93	2.416	7 51 21.99	155.90	+16 3 20.3	-346.6	70.95	16 20.5	59 52.0	I. N. S.
26	10 24.07	2.341	8 52 36.46	150.70	13 13 31.9	-426.0	69.82	16 18.5	59 44.7	I. N. S.
27	11 19.18	2.250	9 51 48.49	145.21	9 32 37.2	-600.8	68.44	16 13.2	59 25.0	I. N. S.
28	12 12.07	2.160	10 48 47.60	139.80	5 19 24.2	-659.1	67.09	16 4.6	58 53.5	I. N. S.
Mar. 1	13 2.96	2.064	11 43 45.79	135.22	+ 0 53 2.7	-667.5	65.96	15 53.5	58 12.8	II. S.
2	13 52.25	2.098	12 37 8.08	131.84	- 3 29 7.4	-637.5	65.13	15 40.8	57 26.1	II. S.
3	14 40.44	1.991	13 29 23.65	129.65	- 7 32 44.9	-575.9	64.63	15 27.7	56 38.2	II. S.
4	15 27.97	1.972	14 21 0.00	126.52	-11 0 38.9	-490.1	64.42	15 15.5	55 53.2	II. S.
5	16 15.22	1.966	15 12 19.12	126.16	-14 2 31.8	-386.8	64.39	15 4.8	55 13.8	II. S.
6	17 2.42	1.968	16 3 35.57	126.23	-16 14 26.7	-271.1	64.46	14 56.4	54 43.0	II. S.
7	17 49.09	1.971	16 54 56.13	126.46	-17 38 23.7	-147.6	64.53	14 50.7	54 22.3	II. S.
8	18 37.03	1.973	17 46 20.60	126.54	-18 11 59.9	- 20.1	64.55	14 48.1	54 12.7	II. S.
9	19 24.35	1.970	18 37 44.08	126.37	-17 54 22.9	+107.8	64.47	14 48.6	54 14.4	II. N. S.
10	20 11.55	1.963	19 29 0.28	127.95	-16 46 11.8	229.2	61.31	14 51.9	54 26.7	II. N. S.
11	20 58.55	1.954	20 20 4.89	127.44	-14 49 40.9	348.8	64.11	14 57.9	54 48.4	II. N.
12	21 45.38	1.949	21 10 58.67	127.10	-12 8 49.1	+453.2	63.95	15 5.8	55 17.6	II. N.
13	22 32.15	1.951	22 1 49.42	127.94	- 8 49 29.4	540.2	63.92	15 15.2	55 52.0	II. N.
14	23 19.13	1.967	22 52 52.58	126.18	- 4 59 38.4	604.8	64.12	15 25.3	56 29.2	II. N.
15	0 6.69	2.000	23 44 30.38	130.16	- 0 49 26.7	641.0	64.62	15 35.4	57 6.2	II. N. S.
16	0 55.27	2.059	0 37 0.76	133.32	+ 3 28 40.8	643.5	65.44	15 44.8	57 40.8	I. S.
17	1 45.34	2.123	1 31 16.63	137.59	+ 7 40 14.3	+607.6	66.55	15 52.9	58 10.8	I. S.
18	2 37.28	2.207	2 27 20.42	142.63	11 29 15.1	530.6	67.86	15 59.6	58 35.2	I. S.
19	3 31.30	2.293	3 25 26.54	147.80	14 39 13.9	412.8	69.19	16 4.6	58 53.6	I. S.
20	4 27.24	2.365	4 25 28.68	152.15	16 54 48.6	260.0	70.30	16 8.0	59 6.2	I. S.
21	5 24.57	2.406	5 26 54.52	154.63	18 3 54.2	+ 82.6	70.93	16 9.9	59 13.2	I. N. S.
22	6 22.41	2.406	6 28 51.18	154.66	+17 59 49.8	-103.2	70.95	16 10.5	59 15.2	I. N. S.
23	7 19.76	2.367	7 30 18.34	152.25	16 42 45.0	-279.7	70.35	16 9.7	59 12.2	I. N.
24	8 15.78	2.298	8 30 24.92	148.10	14 19 36.7	-431.0	69.30	16 7.4	59 3.8	I. N.
25	9 9.96	2.217	9 28 41.36	143.24	11 2 41.5	-546.9	68.05	16 3.4	58 49.4	I. N.
26	10 2.22	2.140	10 25 2.03	138.59	7 7 29.8	-622.0	66.83	15 57.8	58 28.7	I. N.
27	10 52.77	2.076	11 19 40.13	134.46	+ 2 50 44.3	-655.0	65.82	15 50.6	58 2.0	I. N.
28	11 42.02	2.031	12 12 59.55	132.05	- 1 31 10.7	-648.3	65.11	15 41.8	57 29.7	I. N. S.
29	12 30.41	2.004	13 5 27.37	130.44	- 5 43 12.7	-606.3	64.70	15 31.9	56 53.5	II. N. S.
30	13 18.34	1.992	13 57 27.91	129.74	- 9 32 18.6	-534.6	64.54	15 21.6	56 15.6	II. S.
31	14 6.12	1.990	14 49 19.15	129.60	-12 47 47.7	-439.4	64.57	15 11.6	55 39.1	II. S.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semi- diameter Passing Meridian.	Geocentric Semi- diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Apr. 1	14 6.12	1.990	14 49 19.15	199.60	-12 47 47.7	-439.4	64.57	15 11.6	55 39.1	II. S.
2	14 53.91	1.992	15 41 10.63	199.69	-15 21 30.5	-396.8	64.66	15 2.7	55 6.2	II. S.
3	15 41.72	1.992	16 33 3.50	199.67	-17 7 49.5	-203.5	64.72	14 55.5	54 39.8	II. S.
4	16 29.46	1.986	17 24 52.18	199.39	-18 3 30.0	-74.6	64.69	14 50.6	54 21.8	II. S.
5	17 16.98	1.973	18 16 27.76	198.59	-18 7 26.6	+54.5	64.54	14 48.4	54 13.8	II. N. s.
6	18 4.14	1.957	19 7 42.12	197.59	-17 20 24.0	+179.7	64.30	14 49.2	54 16.6	II. N.
7	18 50.90	1.940	19 58 31.69	196.58	-15 44 37.6	297.7	64.02	14 53.0	54 30.6	II. N.
8	19 37.31	1.928	20 49 0.23	195.89	-13 23 39.5	405.3	63.81	14 59.7	54 55.1	II. N.
9	20 23.56	1.929	21 39 19.91	195.80	-10 22 14.9	499.3	63.76	15 9.0	55 29.3	II. N.
10	21 10.02	1.946	22 29 51.28	196.91	-6 46 34.6	575.7	63.96	15 20.2	56 10.6	II. N.
11	21 57.12	1.984	23 21 1.86	199.30	-2 44 41.0	+699.4	64.48	15 32.7	56 56.4	II. N.
12	22 45.41	2.045	0 13 23.95	132.88	+1 32 58.5	653.3	65.38	15 45.4	57 43.2	II. N.
13	23 35.45	2.198	1 7 30.67	137.89	5 53 0.3	640.0	66.61	15 57.3	58 26.8	II. N. S.
15	0 27.69	2.297	2 3 50.15	143.84	9 59 4.5	589.5	68.09	16 7.3	59 3.3	I. N. S.
16	1 22.37	2.329	3 2 36.54	149.97	13 32 43.5	477.7	69.62	16 14.6	59 30.3	I. S.
17	2 19.33	2.413	4 3 40.08	155.04	+16 15 25.1	+398.9	70.88	16 18.6	59 44.9	I. S.
18	3 17.90	2.459	5 6 20.68	157.84	17 51 40.3	+148.3	71.61	16 19.4	59 48.0	I. N. S.
19	4 16.99	2.455	6 9 32.11	157.56	18 12 23.4	-45.1	71.60	16 17.4	59 40.7	I. N. s.
20	5 15.34	2.400	7 11 59.30	154.36	17 16 51.0	-299.7	70.86	16 13.2	59 25.3	I. N.
21	6 11.93	2.312	8 12 40.86	148.98	15 12 16.1	-387.8	69.50	16 7.4	59 3.8	I. N.
22	7 6.23	2.213	9 11 4.20	142.98	+12 11 23.2	-599.9	68.11	16 0.6	58 38.8	I. N.
23	7 58.20	2.191	10 7 7.14	137.43	8 29 32.7	-599.4	66.69	15 53.0	58 11.1	I. N.
24	8 48.16	2.047	11 1 10.01	133.04	4 22 29.8	-636.4	65.53	15 45.2	57 42.2	I. N.
25	9 36.67	1.999	11 53 45.13	130.19	+0 5 16.9	-643.9	64.72	15 37.0	57 12.1	I. N.
26	10 24.31	1.974	12 45 27.73	126.65	-4 8 11.5	-618.3	64.29	15 28.6	56 41.5	I. N.
27	11 11.60	1.969	13 36 49.57	128.34	-8 5 16.5	-569.5	64.19	15 20.3	56 10.7	I. N.
28	11 58.94	1.977	14 28 14.26	126.81	-11 34 43.7	-480.7	64.31	15 12.0	55 40.5	I. N. s.
29	12 46.54	1.990	15 19 54.76	129.57	-14 26 59.5	-377.5	64.50	15 4.3	55 12.1	II. N. S.
30	13 34.43	1.999	16 11 52.02	130.13	-16 34 35.5	-258.3	64.68	14 57.5	54 47.0	II. N. S.
May 1	14 22.43	1.999	17 3 56.67	130.13	-17 52 29.5	-130.0	64.74	14 52.0	54 26.9	II. N. s.
2	15 10.29	1.987	17 55 52.65	129.41	-18 18 17.7	+0.1	64.62	14 48.4	54 13.6	II. N.
3	15 57.72	1.984	18 47 23.09	128.05	-17 52 6.6	128.9	64.34	14 47.0	54 8.5	II. N.
4	16 44.54	1.937	19 38 16.28	126.37	-16 36 9.1	249.2	63.96	14 48.2	54 12.9	II. N.
5	17 30.70	1.911	20 28 29.88	124.83	-14 34 10.2	358.6	63.59	14 52.2	54 27.7	II. N.
6	18 16.35	1.896	21 18 13.19	123.92	-11 50 56.4	455.1	63.35	14 59.1	54 53.2	II. N.
7	19 1.84	1.899	22 7 46.75	124.09	-8 32 4.2	+536.5	63.37	15 8.9	55 29.0	II. N.
8	19 47.68	1.926	22 57 41.17	125.71	-4 44 8.4	599.8	63.76	15 21.1	56 13.8	II. N.
9	20 34.50	1.981	23 48 34.66	129.04	-0 35 15.7	640.3	64.58	15 35.1	57 5.4	II. N.
10	21 23.01	2.067	0 41 9.92	134.20	+3 44 4.1	650.6	65.84	15 50.1	58 0.2	II. N.
11	22 13.92	2.179	1 36 8.88	140.94	8 0 5.4	622.1	67.48	16 4.6	58 53.6	II. N.
12	23 7.74	2.308	2 34 3.85	148.71	+11 55 23.6	+545.9	69.34	16 17.3	59 40.4	II. N.
14	0 4.66	2.439	3 35 4.57	156.17	15 9 47.3	417.5	71.12	16 26.9	60 15.4	I. N. S.
15	1 4.21	2.522	4 38 44.11	161.83	17 23 9.6	242.7	72.42	16 32.2	60 35.1	I. N. S.
16	2 5.26	2.592	5 43 53.48	163.45	18 20 8.4	+30.6	72.89	16 32.8	60 37.3	I. N.
17	3 6.18	2.519	6 48 55.55	161.04	+17 54 39.1	-164.8	72.39	16 29.0	60 23.3	I. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
May 17	3 6.18	2.512	6 48 55.55	161.04	+17 54 39.1	-164.8	72.39	16 29.0	60 23.3	I. N.
18	4 5.42	2.417	7 52 16.33	155.25	16 11 32.9	-344.8	71.08	16 21.6	59 56.2	I. N.
19	5 1.96	2.293	8 52 54.48	147.81	13 24 14.7	-484.2	69.34	16 11.8	59 20.2	I. N.
20	5 55.49	2.171	9 50 31.74	140.43	9 50 15.2	-578.3	67.54	16 0.7	58 39.4	I. N.
21	6 46.30	2.068	10 45 24.81	134.26	5 47 19.9	-629.6	65.98	15 49.3	57 57.3	I. N.
22	7 34.99	1.965	11 38 10.74	129.87	+ 1 31 23.4	-643.9	64.83	15 38.2	57 16.8	I. N.
23	8 22.30	1.852	12 29 33.67	127.33	- 2 43 30.9	-626.1	64.12	15 27.9	56 38.8	I. N.
24	9 8.93	1.737	13 20 15.99	126.44	- 6 45 41.3	-580.3	63.83	15 18.5	56 4.4	I. N.
25	9 55.47	1.644	14 10 52.78	126.79	-10 24 30.0	-509.7	63.86	15 10.2	55 33.7	I. N.
26	10 42.32	1.582	15 1 47.94	127.88	-13 30 34.8	-417.2	64.08	15 2.9	55 6.8	I. N.
27	11 29.65	1.561	15 53 11.77	129.08	-15 55 52.8	-306.6	64.39	14 56.6	54 43.9	I. N.
28	12 17.38	1.594	16 45 0.49	129.86	-17 34 5.7	-182.9	64.59	14 51.5	54 25.1	I. N.
29	13 5.23	1.594	17 36 58.62	129.82	-18 21 12.7	- 52.3	64.60	14 47.7	54 11.2	II. N.
30	13 52.97	1.577	18 28 44.14	128.81	-18 15 52.8	+ 78.3	64.39	14 45.5	54 3.0	II. N.
31	14 40.09	1.548	19 19 55.91	127.07	-17 19 24.2	202.5	63.99	14 45.1	54 1.6	II. N.
June 1	15 26.43	1.514	20 10 20.52	124.97	-15 35 17.1	+315.9	63.51	14 46.9	54 8.1	II. N.
2	16 11.97	1.483	20 59 56.14	123.14	-13 1 50.8	415.2	63.09	14 51.1	54 23.5	II. N.
3	16 56.91	1.465	21 48 57.22	122.09	-10 5 11.5	498.9	62.89	14 57.8	54 48.3	II. N.
4	17 41.68	1.469	22 37 47.33	122.34	- 6 31 41.2	565.6	62.94	15 7.3	55 23.0	II. N.
5	18 26.83	1.502	23 27 3.33	124.30	- 2 35 15.3	613.0	63.46	15 19.3	56 7.1	II. N.
6	19 13.25	1.568	0 17 29.87	128.25	+ 1 35 39.9	+637.2	64.47	15 33.5	56 59.3	II. N.
7	20 1.62	2.069	1 9 56.30	134.30	5 50 29.3	631.2	65.98	15 49.2	57 56.9	II. N.
8	20 52.78	2.200	2 5 10.97	142.90	9 55 27.6	596.3	67.91	16 5.2	58 55.8	II. N.
9	21 47.35	2.349	3 3 50.47	151.17	13 33 2.1	492.8	70.04	16 20.2	59 50.8	II. N.
10	22 45.44	2.480	4 6 3.55	159.67	16 22 41.1	346.6	72.01	16 32.4	60 35.6	II. N.
11	23 46.52	2.587	5 11 13.78	165.57	+18 4 8.1	+154.2	73.36	16 40.2	61 4.4	II. N.
13	0 49.09	2.611	6 17 54.72	167.00	18 22 55.2	- 61.8	73.71	16 42.7	61 13.7	I. N.
14	1 51.24	2.553	7 24 10.57	163.56	17 15 42.8	-270.1	72.94	16 39.5	61 1.8	I. N.
15	2 51.24	2.438	8 28 16.97	156.54	14 51 41.2	-442.1	71.35	16 31.4	60 31.9	I. N.
16	3 46.08	2.298	9 29 13.15	148.08	11 28 48.5	-563.2	69.28	16 19.6	59 48.7	I. N.
17	4 41.59	2.165	10 26 48.82	140.09	+ 7 28 3.7	-632.4	67.46	16 5.7	58 57.6	I. N.
18	5 32.19	2.058	11 21 29.88	133.66	+ 3 9 0.6	-656.3	65.86	15 51.2	58 4.2	I. N.
19	6 20.63	1.984	12 14 0.45	129.23	- 1 12 3.2	-643.8	61.73	15 37.1	57 12.7	I. N.
20	7 7.69	1.943	13 5 8.98	126.78	- 5 22 5.8	-602.2	64.08	15 24.4	56 25.9	I. N.
21	7 54.14	1.931	13 55 39.80	126.03	- 9 10 35.4	-536.6	63.83	15 13.3	55 45.1	I. N.
22	8 40.54	1.938	14 46 8.00	126.48	-12 28 41.5	-450.7	63.90	15 4.1	55 11.3	I. N.
23	9 27.27	1.957	15 36 56.23	127.59	-15 8 48.5	-347.2	64.13	14 56.7	54 44.2	I. N.
24	10 14.48	1.976	16 28 12.71	128.74	-17 4 34.8	-229.6	64.36	14 51.1	54 23.5	I. N.
25	11 2.05	1.986	17 19 51.41	129.36	-18 11 14.2	-102.6	64.48	14 47.1	54 9.0	I. N.
26	11 49.70	1.982	18 11 35.09	129.10	-18 26 9.3	+ 28.0	64.40	14 44.8	54 0.3	I. N.
27	12 37.06	1.962	19 3 0.72	127.89	-17 49 13.8	+155.5	64.09	14 43.9	53 57.1	II. N.
28	13 23.81	1.930	19 53 48.09	125.98	-16 22 55.1	274.0	63.62	14 44.7	54 0.0	II. N.
29	14 9.66	1.894	20 43 45.29	123.80	-14 11 49.1	378.8	63.10	14 47.2	54 9.2	II. N.
30	14 54.73	1.864	21 32 53.39	121.98	-11 22 3.1	467.0	62.68	14 51.5	54 25.2	II. N.
31	15 39.23	1.848	22 21 27.15	121.03	- 8 0 35.6	+537.0	62.50	14 58.0	54 49.0	II. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
July 1	15 39.23	1.848	22 21 27.15	121.03	- 8 0 35.6	+537.0	62.50	14 58.0	54 49.0	II. N.
2	16 23.61	1.855	23 9 53.94	121.46	- 4 14 58.8	587.8	62.66	15 6.7	55 20.9	II. N.
3	17 8.51	1.869	23 58 51.71	123.68	- 0 13 18.9	616.9	63.27	15 17.6	56 1.0	II. N.
4	17 51.68	1.962	0 49 6.31	127.90	+ 3 55 14.8	621.3	64.40	15 30.7	56 49.0	II. N.
5	18 42.97	2.068	1 41 27.87	134.25	7 59 42.7	595.4	66.02	15 45.4	57 43.0	II. N.
6	19 34.16	2.203	2 36 44.55	142.44	+11 46 20.6	+530.9	68.03	16 1.0	58 40.4	II. N.
7	20 28.85	2.356	3 35 31.59	151.57	14 58 12.1	490.3	70.21	16 16.3	59 36.7	II. N.
8	21 27.14	2.497	4 37 54.63	160.06	17 16 1.0	260.9	72.17	16 29.8	60 26.3	II. N.
9	22 28.34	2.592	5 43 13.23	165.53	18 21 25.0	+ 60.8	73.46	16 39.8	61 3.0	II. N.
10	23 30.97	2.619	6 49 59.97	167.06	18 2 24.7	-156.2	73.72	16 44.8	61 21.3	II. N.
12	0 33.12	2.554	7 56 13.95	163.54	+16 18 25.2	-358.5	72.90	16 44.0	61 18.2	I. N.
13	1 33.13	2.440	9 0 20.86	156.65	13 21 17.8	-518.4	71.31	16 37.3	60 53.8	I. N.
14	2 30.07	2.304	10 1 22.93	148.48	9 31 20.4	-621.7	69.40	16 26.0	60 12.2	I. N.
15	3 23.80	2.177	10 59 12.53	140.85	5 11 18.2	-669.7	67.58	16 11.5	59 19.1	I. N.
16	4 14.78	2.076	11 54 15.84	134.74	+ 0 41 51.4	-670.7	66.10	15 55.7	58 20.8	I. N.
17	5 3.69	2.006	12 47 15.08	130.53	- 3 40 19.7	-635.1	65.06	15 39.9	57 22.8	I. N.
18	5 51.29	1.966	13 38 55.57	126.14	- 7 42 33.0	-572.1	64.46	15 25.3	56 29.1	I. N.
19	6 38.25	1.951	14 29 57.72	127.25	-11 15 10.6	-487.9	64.22	15 12.6	55 43.5	I. N.
20	7 25.09	1.954	15 20 52.42	127.43	-14 10 41.2	-387.1	64.23	15 2.2	55 4.5	I. N.
21	8 12.12	1.966	16 11 58.42	128.11	-16 23 8.1	-273.2	64.35	14 54.3	54 35.5	I. N.
22	8 59.43	1.976	17 3 21.32	128.75	-17 47 55.6	-149.5	64.45	14 48.8	54 15.1	I. N.
23	9 46.91	1.978	17 54 54.32	128.89	-18 22 4.3	- 90.8	64.43	14 45.5	54 3.2	I. N.
24	10 34.30	1.968	18 46 21.90	128.27	-18 4 32.8	+106.0	64.22	14 44.2	53 58.4	I. N.
25	11 21.28	1.945	19 37 25.46	126.91	-16 56 35.2	230.6	63.83	14 44.7	54 0.0	I. N.
26	12 7.62	1.915	20 27 49.86	125.07	-15 1 41.4	341.7	63.33	14 46.7	54 7.6	II. N.
27	12 53.20	1.884	21 17 28.51	123.18	-12 25 19.5	+437.2	62.85	14 50.2	54 20.5	II. N.
28	13 38.10	1.860	22 6 26.42	121.77	- 9 14 25.6	513.9	62.51	14 55.2	54 38.8	II. N.
29	14 22.60	1.852	22 55 0.48	121.27	- 5 36 55.2	569.9	62.43	15 1.6	55 2.3	II. N.
30	15 7.17	1.867	23 43 38.41	122.15	- 1 41 25.7	603.6	62.72	15 9.6	55 31.5	II. N.
31	15 52.41	1.909	0 32 56.74	124.68	+ 2 22 43.4	612.9	63.45	15 19.1	56 6.4	II. N.
Aug. 1	16 39.03	1.982	1 23 38.03	129.07	+ 6 25 13.1	+594.6	64.64	15 30.2	56 47.1	II. N.
2	17 27.76	2.085	2 16 26.96	135.28	10 14 12.4	544.5	66.25	15 42.6	57 32.7	II. N.
3	18 19.29	2.212	3 12 3.56	142.94	13 35 48.9	456.9	68.17	15 55.9	58 21.8	II. N.
4	19 14.02	2.348	4 10 52.63	151.12	16 14 9.0	297.8	70.14	16 9.4	59 11.3	II. N.
5	20 11.87	2.467	5 12 49.81	158.33	17 52 32.3	+157.9	71.81	16 22.0	59 57.3	II. N.
6	21 12.11	2.542	6 17 10.76	162.82	+18 16 34.6	- 41.0	72.80	16 32.0	60 34.3	II. N.
7	22 13.39	2.552	7 22 33.99	163.42	17 18 43.3	-247.3	72.88	16 38.3	60 57.5	II. N.
8	23 14.10	2.496	8 27 23.47	160.14	15 1 36.1	-432.5	72.07	16 39.7	61 2.4	II. N.
10	0 12.96	2.401	9 30 20.00	154.28	11 38 24.7	-573.7	70.68	16 35.7	60 47.8	I. N.
11	1 9.21	2.268	10 30 41.67	147.51	7 30 7.5	-659.0	69.06	16 26.7	60 14.8	I. N.
12	2 2.83	2.184	11 28 24.42	141.22	+ 2 58 50.0	-688.8	67.56	16 13.9	59 27.7	I. N.
13	2 54.18	2.100	12 23 50.16	136.18	- 1 34 34.7	-671.2	66.36	15 58.8	58 32.2	I. N.
14	3 43.81	2.041	13 17 32.96	129.64	- 5 53 16.2	-616.9	65.52	15 42.9	57 34.0	I. N.
15	4 32.32	2.006	14 10 8.42	120.53	- 9 44 31.5	-535.5	65.03	15 27.8	56 38.4	I. N.
16	5 20.23	1.989	15 2 7.17	122.52	-12 59 8.8	-434.8	64.80	15 14.3	55 48.9	I. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
Aug. 16	h m	m	h m s	s	° ' "	"	s	' "	' "	I. N.
17	5 20.23	1.989	15 2 7.17	129.52	-12 59 8.8	-434.8	64.80	15 14.3	55 48.9	I. N.
18	6 7.89	1.984	15 53 51.13	129.22	-15 30 36.8	-320.6	64.73	15 3.2	55 8.1	I. N.
19	6 55.50	1.983	16 45 31.91	129.18	-17 14 25.6	-197.3	64.70	14 54.8	54 37.1	I. N.
20	7 43.07	1.980	17 37 10.93	129.02	-18 7 47.7	-69.0	64.61	14 49.2	54 16.6	I. N.
21	8 30.51	1.971	18 28 41.48	128.45	-18 9 36.7	+59.7	64.40	14 46.3	54 5.9	I. N.
22	9 17.62	1.963	19 19 52.49	127.38	-17 20 32.5	+184.6	64.06	14 45.9	54 4.4	I. N.
23	10 4.23	1.930	20 10 33.28	125.96	-15 43 7.3	300.7	63.62	14 47.6	54 10.7	I. N.
24	10 50.24	1.904	21 0 37.80	124.43	-13 21 43.7	403.7	63.17	14 51.1	54 23.7	I. N.
25	11 35.68	1.885	21 50 8.00	123.16	-10 22 24.3	489.7	62.81	14 56.1	54 41.9	I. N.
26	12 20.73	1.873	22 39 15.04	122.56	-6 52 40.0	555.7	62.64	15 2.2	55 4.5	II. N.
27	13 5.73	1.880	23 28 19.04	122.97	-3 1 14.8	+597.8	62.77	15 9.3	55 30.5	II. N.
28	13 51.14	1.908	0 17 47.85	124.66	+1 2 2.8	614.3	63.26	15 17.1	55 59.1	II. N.
29	14 37.52	1.961	1 8 14.86	127.83	5 6 20.2	602.3	64.15	15 25.6	56 30.3	II. N.
30	15 25.47	2.038	2 0 15.84	132.48	8 59 39.8	558.9	65.41	15 34.6	57 3.6	II. N.
31	16 15.53	2.137	2 54 24.21	138.38	12 28 51.6	481.9	66.95	15 44.2	57 38.9	II. N.
Sept. 1	17 8.10	2.246	3 51 3.76	144.95	+15 19 45.7	+367.3	68.62	15 54.3	58 15.6	II. N.
2	18 3.27	2.349	4 50 19.60	151.21	17 17 54.5	218.2	70.15	16 4.2	58 52.0	II. N.
3	19 0.67	2.428	5 51 49.80	155.93	18 10 20.0	+40.3	71.26	16 13.4	59 25.9	II. N. S.
4	19 59.47	2.463	6 54 43.97	158.07	17 48 14.1	-151.7	71.72	16 21.1	59 54.3	II. N. S.
5	20 58.53	2.449	7 57 53.54	157.24	16 9 47.6	-337.7	71.45	16 26.4	60 13.6	II. S.
6	21 56.72	2.394	9 0 11.48	153.92	+13 21 40.0	-496.8	70.60	16 28.2	60 20.2	II. S.
7	22 53.28	2.317	10 0 50.90	149.23	9 38 12.3	-612.3	69.43	16 25.9	60 12.0	II. S.
8	23 47.89	2.235	10 59 32.75	144.30	5 18 40.7	-676.4	68.21	16 19.6	59 48.5	II. N. S.
9	0 40.63	2.163	11 56 22.17	139.97	+0 43 54.0	-689.3	67.15	16 9.6	59 11.8	I. N.
10	1 31.82	2.107	12 51 39.04	136.62	-3 46 39.7	-656.7	66.35	15 56.8	58 25.0	I. N.
11	2 21.90	2.069	13 45 48.34	134.22	-7 56 36.5	-587.7	65.63	15 42.8	57 33.5	I. N.
12	3 11.23	2.045	14 39 13.07	132.87	-11 33 16.8	-491.8	65.52	15 28.7	56 41.7	I. N.
13	4 0.11	2.029	15 32 9.93	131.94	-14 27 38.4	-377.6	65.34	15 15.7	55 53.9	I. N.
14	4 48.66	2.017	16 24 47.59	131.91	-16 33 49.6	-259.0	65.19	15 4.3	55 12.2	I. N.
15	5 36.91	2.003	17 17 6.98	130.38	-17 48 36.0	-121.3	65.02	14 56.1	54 42.1	I. N.
16	6 24.77	1.985	18 9 3.35	129.28	-18 10 53.8	+9.6	64.73	14 50.5	54 21.5	I. N. S.
17	7 12.14	1.962	19 0 29.65	127.88	-17 41 28.9	136.9	64.34	14 47.9	54 11.8	I. N. S.
18	7 58.91	1.936	19 51 20.19	126.33	-16 22 41.7	255.9	63.88	14 48.2	54 12.8	I. S.
19	8 45.07	1.912	20 41 33.88	124.85	-14 18 16.8	364.0	63.43	14 51.0	54 23.3	I. S.
20	9 30.71	1.893	21 31 16.24	123.76	-11 33 17.8	458.2	63.07	14 56.1	54 42.1	I. S.
21	10 16.04	1.887	22 20 40.19	123.37	-8 14 6.9	+534.5	62.91	15 2.9	55 7.2	I. S.
22	11 1.40	1.896	23 10 5.70	123.93	-4 28 31.1	580.6	63.01	15 11.0	55 36.8	I. S.
23	11 47.21	1.925	23 59 58.63	125.68	-0 25 51.3	619.9	63.45	15 19.7	56 8.6	I. N. S.
24	12 33.98	1.976	0 50 48.64	128.70	+3 42 53.8	619.3	64.25	15 28.6	56 41.2	II. N. S.
25	13 22.20	2.046	1 43 6.35	132.96	7 45 4.9	585.6	65.37	15 37.1	57 12.5	II. N. S.
26	14 12.32	2.133	2 37 18.69	138.19	+11 26 36.9	+515.3	66.74	15 45.1	57 41.8	II. N.
27	15 4.64	2.227	3 33 42.74	143.83	14 32 35.4	408.1	68.21	15 52.4	58 8.6	II. N.
28	15 59.14	2.313	4 32 18.50	149.01	16 48 24.8	265.8	69.53	15 58.8	58 32.3	II. N.
29	16 55.46	2.375	5 32 43.34	152.75	18 1 34.6	+96.5	70.48	16 4.4	58 53.0	II. N. S.
30	17 52.85	2.400	6 34 12.61	154.28	+18 3 45.8	-86.4	70.86	16 9.1	59 10.0	II. N. S.



## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Oct. 1	18 50.36	2.385	7 35 49.35	153.40	+16 52 48.0	-266.7	70.64	16 12.5	59 22.6	II. S.
2	19 47.10	2.338	8 36 39.89	150.56	14 33 14.1	-488.7	69.91	16 14.2	59 20.3	II. S.
3	20 42.47	2.374	9 36 7.85	146.69	11 15 52.0	-553.7	68.91	16 14.1	59 28.6	II. S.
4	21 36.25	2.308	10 33 50.93	142.71	7 15 56.1	-638.6	67.88	16 11.5	59 18.9	II. S.
5	22 28.55	2.153	11 30 22.84	139.34	+ 2 51 5.8	-678.0	66.99	16 6.2	58 59.6	II. S.
6	23 19.68	2.112	12 25 35.70	136.90	- 1 39 55.2	-672.5	66.35	15 58.4	58 31.0	II. S.
8	0 10.03	2.087	13 20 1.59	135.40	- 0 1 29.8	-686.5	65.97	15 48.5	57 54.5	I. S.
9	0 59.94	2.074	14 14 0.68	134.61	- 9 56 59.4	-546.0	65.80	15 37.2	57 12.9	I. S.
10	1 49.61	2.066	15 7 45.54	134.14	-13 14 48.5	-439.4	65.74	15 25.4	56 29.6	I. S.
11	2 39.09	2.057	16 1 19.10	133.60	-15 46 10.5	-315.2	65.67	15 14.1	55 48.0	I. S.
12	3 28.28	2.041	16 54 35.34	132.66	-17 25 44.0	-181.7	65.50	15 4.1	55 11.4	I. S.
13	4 16.99	2.016	17 47 22.43	131.17	-18 11 17.6	- 46.3	65.18	14 56.2	54 42.4	I. S.
14	5 5.00	1.983	18 39 27.57	129.18	-18 3 19.9	+ 85.0	64.71	14 50.9	54 23.0	I. S.
15	5 52.17	1.947	19 30 41.86	126.99	-17 4 21.3	208.1	64.15	14 48.6	54 14.4	I. S.
16	6 38.47	1.912	20 21 3.86	124.91	-15 18 16.7	320.1	63.59	14 49.3	54 17.0	I. S.
17	7 24.02	1.886	21 10 41.36	123.34	-12 49 58.0	+419.0	63.14	14 53.0	54 30.5	I. S.
18	8 9.12	1.875	21 59 51.10	122.66	- 9 45 3.6	502.8	62.91	14 59.4	54 54.0	I. S.
19	8 54.17	1.883	22 48 57.85	122.12	- 6 10 4.3	568.9	62.97	15 8.0	55 25.8	I. S.
20	9 39.68	1.914	23 38 32.39	125.00	- 2 12 47.5	613.5	63.40	15 18.4	56 3.7	I. S.
21	10 26.22	1.969	0 29 9.38	126.33	+ 1 57 12.4	631.5	64.21	15 29.5	56 44.7	I. S.
22	11 14.39	2.049	1 21 24.04	133.10	+ 6 8 2.7	+616.7	65.40	15 40.7	57 25.7	I. S.
23	12 4.70	2.146	2 15 47.28	138.98	10 5 21.8	563.0	66.88	15 51.0	58 3.5	II. N. S.
24	12 57.46	2.250	3 12 38.32	145.98	13 32 46.8	479.1	68.49	15 59.5	58 35.2	II. N. S.
25	13 52.64	2.345	4 11 55.66	150.98	16 13 14.0	399.1	69.90	16 6.3	58 58.9	II. N. S.
26	14 49.80	2.410	5 13 10.43	154.86	17 51 40.7	+158.5	70.88	16 10.3	59 14.5	II. N. S.
27	15 47.97	2.426	6 15 26.71	156.00	+18 17 53.6	- 28.9	71.22	16 12.2	59 21.6	II. S.
28	16 46.00	2.400	7 17 35.19	154.25	17 28 54.2	-214.0	70.85	16 12.1	59 21.2	II. S.
29	17 42.88	2.335	8 18 33.27	150.39	15 29 26.0	-378.6	69.93	16 10.4	59 14.8	II. S.
30	18 37.94	2.253	9 17 42.14	145.37	12 30 22.9	-510.5	68.72	16 7.3	59 3.5	II. S.
31	19 31.02	2.173	10 14 52.14	140.58	8 46 19.1	-603.1	67.50	16 3.1	58 48.2	II. S.
Nov. 1	20 22.36	2.109	11 10 17.53	136.70	+ 4 33 19.0	-655.1	66.49	15 57.8	58 28.7	II. S.
2	21 12.43	2.068	12 4 26.71	134.25	+ 0 7 33.5	-667.2	65.80	15 51.5	58 5.6	II. S.
3	22 1.73	2.049	12 57 52.39	133.10	- 4 15 24.0	-641.5	65.45	15 44.2	57 38.5	II. S.
4	22 50.90	2.047	13 51 3.82	133.00	- 8 21 1.5	-581.3	65.38	15 35.8	57 7.8	II. S.
5	23 40.11	2.055	14 44 21.08	133.49	-11 56 19.9	-490.9	65.49	15 26.8	56 34.8	II. S.
7	0 29.53	2.063	15 37 51.40	134.00	-14 50 28.5	-376.5	65.63	15 17.6	56 0.8	I. S.
8	1 19.07	2.063	16 31 28.28	133.95	-16 55 26.7	-246.3	65.67	15 8.5	55 27.7	I. N. S.
9	2 8.42	2.047	17 24 54.11	133.03	-18 6 32.8	-108.7	65.49	15 0.5	54 58.1	I. N. S.
10	2 57.21	2.016	18 17 45.99	131.14	-18 22 31.9	+ 28.0	65.08	14 53.9	54 34.0	I. S.
11	3 45.09	1.973	19 9 43.29	128.55	-17 45 10.5	162.1	64.48	14 49.5	54 17.6	I. S.
12	4 31.87	1.926	20 0 34.15	125.70	-16 18 26.0	+274.5	63.80	14 47.5	54 10.5	I. S.
13	5 17.55	1.884	20 50 19.14	123.15	-14 7 38.7	377.2	63.17	14 48.5	54 14.0	I. S.
14	6 2.37	1.855	21 39 11.90	121.42	-11 18 43.0	464.9	62.72	14 52.4	54 28.5	I. S.
15	6 46.73	1.847	22 27 37.43	120.95	- 7 57 53.0	536.6	62.57	14 59.4	54 54.1	I. S.
16	7 31.20	1.865	23 16 9.94	122.04	- 4 11 49.9	+590.5	62.83	15 9.1	55 29.7	I. S.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi- diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	"	"	
Nov. 17	8 16.47	1.913	0 530.17	194.95	- 0 8 13.7	+623.6	63.54	15 21.1	56 13.9	I. S.
18	9 3.28	1.903	0 56 22.59	199.73	+ 4 3 27.5	629.8	64.72	15 34.6	57 3.6	I. S.
19	9 52.34	2.101	1 49 31.10	136.23	8 11 4.2	601.8	66.31	15 48.7	57 55.2	I. S.
20	10 44.27	2.229	2 45 31.60	143.92	11 59 12.6	531.3	68.18	16 2.0	58 44.1	I. S.
21	11 39.33	2.356	3 44 40.82	151.74	15 9 40.0	412.9	70.06	16 13.3	59 25.6	I. S.
22	12 37.26	2.463	4 46 43.02	158.04	+17 23 30.1	+249.5	71.57	16 21.5	59 55.5	II. S.
23	13 37.14	2.515	5 50 42.13	161.94	18 24 59.5	+ 54.5	72.36	16 25.7	60 11.2	II. S.
24	14 37.50	2.502	6 55 10.21	160.43	18 6 6.0	-148.1	72.23	16 26.0	60 12.1	II. S.
25	15 36.80	2.430	7 58 34.19	156.08	16 28 57.7	-329.8	71.27	16 22.6	59 59.5	II. S.
26	16 33.89	2.394	8 59 45.83	149.70	13 44 48.2	-481.0	69.80	16 16.4	59 36.8	II. S.
27	17 28.32	2.213	9 58 17.36	143.09	+10 10 9.7	-584.7	68.19	16 8.3	59 7.3	II. S.
28	18 20.25	2.118	10 54 17.79	137.37	6 2 57.9	-644.3	66.76	15 59.3	58 34.1	II. S.
29	19 10.20	2.050	11 48 19.47	133.17	+ 1 40 9.6	-663.6	65.70	15 50.0	57 59.8	II. S.
30	19 58.87	2.012	12 41 4.55	130.68	- 2 43 8.4	-647.4	65.06	15 40.7	57 25.8	II. S.
Dec. 1	20 46.97	2.001	13 33 14.76	130.21	- 6 53 32.2	-599.6	64.83	15 31.8	56 53.0	II. S.
2	21 35.05	2.009	14 25 24.13	130.72	-10 39 4.5	-523.7	64.90	15 23.2	56 21.7	II. S.
3	22 23.47	2.027	15 17 54.15	131.81	-13 49 10.3	-421.5	65.14	15 15.2	55 52.0	II. S.
4	23 12.34	2.043	16 10 50.47	132.79	-16 14 54.5	-302.9	65.35	15 7.6	55 24.2	II. S.
6	0 1.46	2.047	17 4 2.69	133.04	-17 49 44.7	-169.8	65.40	15 0.7	54 58.8	I. S.
7	0 50.47	2.033	17 57 7.84	132.17	-18 30 7.8	- 32.0	65.20	14 54.6	54 36.6	I. S.
8	1 38.90	1.999	18 49 37.69	130.13	-18 15 49.8	+102.2	64.72	14 49.8	54 19.0	I. S.
9	2 26.32	1.951	19 41 7.76	127.96	-17 9 41.1	226.3	64.05	14 46.6	54 7.2	I. S.
10	3 12.53	1.900	20 31 24.51	124.14	-15 16 48.5	335.4	63.30	14 45.4	54 2.7	I. S.
11	3 57.55	1.854	21 20 29.16	121.36	-12 43 35.6	427.9	62.64	14 46.5	54 6.9	I. S.
12	4 41.63	1.823	22 8 37.77	119.56	- 9 36 53.9	-502.8	62.20	14 50.4	54 21.0	I. S.
13	5 25.25	1.817	22 56 19.12	119.16	- 6 3 39.2	+580.5	62.13	14 57.1	54 45.8	I. S.
14	6 9.07	1.840	23 44 11.99	120.55	- 2 10 56.5	599.9	62.51	15 6.6	55 20.7	I. S.
15	6 53.85	1.897	0 33 2.61	124.01	+ 1 53 28.9	618.4	63.41	15 19.0	56 5.9	I. S.
16	7 40.43	1.990	1 23 41.63	129.61	6 0 16.8	610.7	64.82	15 33.4	56 59.1	I. S.
17	8 29.65	2.117	2 16 59.74	137.21	9 57 30.8	569.0	66.70	15 49.3	57 57.4	I. S.
18	9 22.23	2.267	3 13 38.88	146.21	+13 29 47.8	+424.6	68.87	16 5.4	58 56.5	I. S.
19	10 18.45	2.417	4 13 58.31	155.29	16 18 31.3	350.7	71.01	16 19.9	59 49.8	I. S.
20	11 17.99	2.536	5 17 37.47	162.48	18 4 5.9	+170.3	72.65	16 31.4	60 32.0	I. S.
21	12 19.69	2.591	6 23 26.13	165.79	18 30 42.2	- 40.1	73.42	16 38.4	60 57.8	II. S.
22	13 21.76	2.567	7 29 36.77	164.31	17 31 53.3	-251.4	73.10	16 40.0	61 3.6	II. S.
23	14 22.38	2.475	8 34 20.27	158.80	+15 13 29.4	-433.5	71.86	16 36.3	60 49.9	II. S.
24	15 20.31	2.350	9 36 22.69	151.54	11 51 35.8	-566.9	70.13	16 28.0	60 19.5	II. S.
25	16 15.17	2.294	10 35 19.51	143.67	7 47 12.5	-646.4	68.33	16 16.6	59 37.6	II. S.
26	17 7.21	2.118	11 31 27.22	137.30	+ 3 21 12.3	-676.2	66.80	16 3.5	58 49.6	II. S.
27	17 57.10	2.045	12 25 25.08	132.85	- 1 8 19.6	-665.4	65.68	15 50.0	58 0.1	II. S.
28	18 45.60	2.003	13 17 59.79	130.35	- 5 26 41.2	-621.6	65.03	15 37.2	57 12.8	II. S.
29	19 33.45	1.999	14 9 55.22	129.51	- 9 21 59.1	-550.9	64.78	15 25.5	56 29.8	II. S.
30	20 21.22	1.996	15 1 45.77	129.85	-12 44 44.3	-458.0	64.81	15 15.2	55 52.1	II. S.
31	21 9.25	2.008	15 53 52.17	130.72	-15 25 45.4	-346.3	64.96	15 6.5	55 20.1	II. S.
32	21 57.61	2.021	16 46 19.42	131.47	-17 19 29.8	-220.6	65.09	14 59.3	54 53.6	II. S.

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Som. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Som. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	0 34.1	19 16 12.87	-20 24 38.3	12.7	4.8	0.34	Feb. 14	23 1.1	20 44 26.69	-19 43 20.4	7.0	2.6	0.18
1	0 25.1	19 11 9.79	20 15 33.8	12.9	4.8	0.34	15	23 3.5	20 50 45.30	19 23 46.4	6.9	2.6	0.18
2	0 15.7	19 5 42.18	20 7 57.3	13.0	4.9	0.34	16	23 5.9	20 57 5.95	19 2 52.7	6.9	2.6	0.18
3	0 6.1	19 0 0.27	20 1 48.8	13.0	4.9	0.35	17	23 8.3	21 3 28.50	18 40 39.1	6.8	2.6	0.18
3	23 56.4	18 54 14.90	19 57 7.3	13.0	4.9	0.35	18	23 10.8	21 9 52.84	18 17 5.4	6.8	2.6	0.17
4	23 46.8	18 48 36.70	-19 53 52.2	13.1	4.9	0.35	19	23 13.3	21 16 18.90	-17 52 11.5	6.7	2.5	0.17
5	23 37.6	18 43 15.54	19 52 3.0	13.1	4.9	0.35	20	23 15.8	21 22 46.60	17 25 57.3	6.7	2.5	0.17
6	23 28.7	18 38 19.82	19 51 38.7	13.0	4.9	0.34	21	23 18.3	21 29 15.87	16 58 22.5	6.7	2.5	0.17
7	23 20.4	18 33 56.18	19 52 37.2	12.8	4.9	0.34	22	23 20.9	21 35 46.67	16 29 27.2	6.6	2.5	0.17
8	23 12.7	18 30 9.38	19 54 55.3	12.6	4.8	0.33	23	23 23.5	21 42 19.00	15 59 11.2	6.6	2.5	0.17
9	23 5.6	18 27 2.37	-19 58 28.8	12.3	4.7	0.32	24	23 26.1	21 48 52.82	-15 27 34.4	6.6	2.5	0.17
10	22 59.3	18 24 36.52	20 3 11.3	12.1	4.6	0.32	25	23 28.7	21 55 28.14	14 54 36.9	6.6	2.5	0.17
11	22 53.6	18 22 51.82	20 8 55.0	11.9	4.5	0.31	26	23 31.4	22 2 4.96	14 20 18.9	6.6	2.5	0.17
12	22 48.6	18 21 47.30	20 15 31.4	11.6	4.4	0.30	27	23 34.1	22 8 43.30	13 44 40.5	6.6	2.5	0.17
13	22 44.2	18 21 21.24	20 22 51.2	11.3	4.3	0.30	28	23 36.8	22 15 23.19	13 7 41.8	6.5	2.5	0.16
14	22 40.5	18 21 31.49	-20 30 44.5	11.1	4.2	0.29	Mar. 1	23 39.5	22 22 4.67	-12 29 23.2	6.5	2.4	0.16
15	22 37.3	18 22 15.65	20 39 1.3	10.8	4.1	0.29	2	23 42.3	22 28 47.79	11 49 45.0	6.5	2.4	0.16
16	22 34.6	18 23 31.15	20 47 32.2	10.6	4.0	0.28	3	23 45.1	22 35 32.59	11 8 47.7	6.5	2.4	0.16
17	22 32.4	18 25 15.45	20 56 8.0	10.3	3.9	0.28	4	23 47.9	22 42 19.12	10 26 31.8	6.5	2.4	0.16
18	22 30.6	18 27 26.12	21 4 39.9	10.1	3.8	0.27	5	23 50.8	22 49 7.44	9 42 58.2	6.5	2.4	0.16
19	22 29.3	18 30 0.83	-21 12 59.8	9.8	3.7	0.26	6	23 53.7	22 55 57.60	-8 58 7.7	6.5	2.4	0.16
20	22 28.3	18 32 57.40	21 21 0.7	9.6	3.7	0.26	7	23 56.6	23 2 49.66	8 19 1.6	6.5	2.4	0.16
21	22 27.6	18 36 13.83	21 28 35.6	9.4	3.6	0.25	8	23 59.5	23 9 43.64	7 24 41.5	6.5	2.4	0.16
22	22 27.3	18 39 48.25	21 35 38.3	9.3	3.5	0.25	10	0 2.5	23 16 39.58	6 36 9.3	6.5	2.4	0.16
23	22 27.2	18 43 39.01	21 42 3.5	9.1	3.4	0.25	11	0 5.5	23 23 37.49	5 46 26.9	6.5	2.4	0.16
24	22 27.3	18 47 44.59	-21 47 46.3	9.0	3.3	0.24	12	0 8.6	23 30 37.31	-4 55 37.0	6.5	2.5	0.16
25	22 27.7	18 52 3.63	21 52 42.2	8.8	3.3	0.24	13	0 11.7	23 37 39.03	4 3 42.6	6.5	2.5	0.16
26	22 28.3	18 56 34.89	21 56 47.2	8.7	3.3	0.23	14	0 14.8	23 44 42.58	3 10 47.8	6.6	2.5	0.16
27	22 29.0	19 1 17.25	21 59 57.9	8.5	3.2	0.23	15	0 17.9	23 51 47.81	2 16 56.8	6.6	2.5	0.17
28	22 29.9	19 6 9.68	22 11.1	8.4	3.2	0.23	16	0 21.1	23 58 54.51	1 22 14.8	6.6	2.5	0.17
29	22 31.0	19 11 11.31	-22 3 24.3	8.3	3.1	0.22	17	0 24.2	0 6 2.43	-0 26 48.0	6.7	2.5	0.17
30	22 32.3	19 16 21.31	22 3 34.7	8.1	3.1	0.22	18	0 27.4	0 13 11.21	+0 29 16.5	6.7	2.5	0.17
31	22 33.6	19 21 38.93	22 2 40.1	8.0	3.1	0.22	19	0 30.6	0 20 20.42	1 25 50.9	6.8	2.6	0.17
Feb. 1	22 35.0	19 27 3.54	22 0 38.7	7.9	3.0	0.21	20	0 33.8	0 27 29.53	2 22 46.0	6.8	2.6	0.17
2	22 36.6	19 32 34.53	21 57 28.9	7.8	3.0	0.21	21	0 37.0	0 34 37.87	3 19 51.1	6.9	2.6	0.17
3	22 38.3	19 38 11.32	-21 53 8.9	7.7	2.9	0.20	22	0 40.2	0 41 44.71	+4 16 55.1	7.0	2.6	0.17
4	22 40.1	19 43 53.45	21 47 37.4	7.6	2.9	0.20	23	0 43.3	0 48 49.16	5 13 45.9	7.1	2.7	0.18
5	22 41.9	19 49 40.45	21 40 53.1	7.6	2.9	0.20	24	0 46.4	0 55 50.21	6 10 10.3	7.2	2.7	0.18
6	22 43.8	19 55 31.87	21 32 54.9	7.5	2.8	0.20	25	0 49.4	1 2 46.76	7 5 42.2	7.3	2.8	0.18
7	22 45.8	20 1 27.44	21 23 42.1	7.4	2.8	0.19	26	0 52.3	1 9 37.60	8 0 43.4	7.5	2.8	0.19
8	22 47.8	20 7 26.81	-21 13 13.8	7.3	2.8	0.19	27	0 55.0	1 16 21.43	+8 54 23.3	7.6	2.9	0.19
9	22 49.9	20 13 29.63	21 1 29.2	7.3	2.7	0.19	28	0 57.7	1 22 56.88	9 46 39.4	7.8	2.9	0.19
10	22 52.1	20 19 35.59	20 48 27.6	7.2	2.7	0.19	29	1 0.2	1 29 22.58	10 37 17.3	8.0	3.0	0.20
11	22 54.3	20 25 44.48	20 34 8.4	7.2	2.7	0.19	30	1 2.5	1 35 37.16	11 26 3.9	8.2	3.0	0.20
12	22 56.5	20 31 56.11	20 18 31.0	7.1	2.7	0.18	31	1 4.6	1 41 39.23	12 12 46.8	8.3	3.1	0.21
13	22 58.8	20 38 10.25	-20 1 35.1	7.0	2.7	0.18	32	1 6.4	1 47 27.40	+12 57 14.3	8.5	3.2	0.21
14	23 1.1	20 44 26.69	-19 43 20.4	7.0	2.6	0.18	33	1 8.0	1 53 0.39	+13 39 16.3	8.7	3.3	0.22

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	1 6.4	1 47 27.40	+12 57 14.3	8.5	3.2	0.21	May 16	22 29.4	2 11 24.16	+9 41 58.9	12.7	4.8	0.33
2	1 8.0	1 53 0.39	13 39 16.3	8.7	3.3	0.22	17	22 27.5	2 13 25.29	9 48 4.9	12.4	4.7	0.32
3	1 9.3	1 58 16.97	14 18 43.8	9.0	3.4	0.22	18	22 25.8	2 15 40.78	9 56 19.1	12.2	4.6	0.31
4	1 10.4	2 3 15.99	14 55 29.2	9.2	3.5	0.23	19	22 24.4	2 18 10.30	10 6 36.0	11.9	4.5	0.31
5	1 11.1	2 7 56.41	15 29 26.0	9.4	3.6	0.24	20	22 23.2	2 20 53.53	10 18 50.6	11.7	4.4	0.30
6	1 11.5	2 12 17.24	+16 0 28.5	9.7	3.6	0.25	21	22 22.1	2 23 50.15	+10 32 57.2	11.4	4.3	0.29
7	1 11.6	2 16 17.60	16 28 32.4	10.0	3.8	0.26	22	22 21.4	2 26 59.39	10 48 50.4	11.2	4.2	0.29
8	1 11.3	2 19 56.72	16 53 33.7	10.3	3.9	0.27	23	22 20.8	2 30 22.50	11 6 24.6	11.0	4.1	0.28
9	1 10.6	2 23 13.96	17 15 29.5	10.6	4.0	0.27	24	22 20.5	2 33 57.75	11 25 34.3	10.8	4.1	0.27
10	1 9.6	2 26 8.75	17 34 17.3	10.9	4.1	0.28	25	22 20.3	2 37 45.47	11 46 13.7	10.5	4.0	0.27
11	1 8.2	2 28 40.62	+17 49 55.2	11.2	4.2	0.29	26	22 20.4	2 41 45.52	+12 8 17.3	10.3	3.9	0.26
12	1 6.4	2 30 49.26	18 2 21.4	11.5	4.3	0.30	27	22 20.7	2 45 57.78	12 31 39.6	10.1	3.8	0.26
13	1 4.2	2 32 34.49	18 11 35.1	11.8	4.5	0.31	28	22 21.1	2 50 22.17	12 56 15.0	9.9	3.8	0.25
14	1 1.6	2 33 56.27	18 17 35.6	12.2	4.6	0.32	29	22 21.7	2 54 58.67	13 21 57.9	9.7	3.7	0.25
15	0 58.7	2 34 54.78	18 20 23.0	12.5	4.7	0.33	30	22 22.6	2 59 47.28	13 48 42.6	9.5	3.6	0.24
16	0 55.3	2 35 30.34	+18 19 57.9	12.8	4.8	0.34	31	22 23.7	3 4 48.03	+14 16 23.3	9.3	3.5	0.24
17	0 51.5	2 35 43.51	18 16 22.4	13.2	5.0	0.35	June 1	22 25.0	3 10 1.01	14 44 54.1	9.1	3.5	0.23
18	0 47.6	2 35 35.06	18 9 39.8	13.5	5.1	0.36	2	22 26.4	3 15 26.30	15 14 9.2	8.9	3.4	0.23
19	0 43.2	2 35 6.03	17 59 54.0	13.8	5.2	0.36	3	22 28.1	3 21 4.00	15 44 2.1	8.8	3.3	0.22
20	0 38.4	2 34 17.71	17 47 11.4	14.1	5.3	0.37	4	22 30.0	3 26 54.27	16 14 26.3	8.6	3.3	0.22
21	0 33.4	2 33 11.63	+17 31 40.3	14.4	5.4	0.38	5	22 32.1	3 32 57.31	+16 45 15.5	8.5	3.2	0.22
22	0 28.1	2 31 49.56	17 13 30.8	14.7	5.5	0.38	6	22 34.4	3 39 13.30	17 16 22.3	8.3	3.1	0.22
23	0 22.5	2 30 13.51	16 52 55.6	14.9	5.6	0.39	7	22 37.0	3 45 42.42	17 47 39.2	8.2	3.1	0.21
24	0 16.8	2 28 25.72	16 30 9.7	15.1	5.7	0.39	8	22 39.7	3 52 24.84	18 18 58.2	8.0	3.0	0.21
25	0 10.9	2 26 28.53	16 5 30.0	15.3	5.8	0.40	9	22 42.7	3 59 20.74	18 50 11.2	7.9	3.0	0.21
26	0 5.0	2 24 24.46	+15 39 15.8	15.5	5.8	0.40	10	22 45.9	4 6 30.28	+19 21 8.9	7.8	2.9	0.20
26	23 58.9	2 22 16.10	15 11 48.3	15.6	5.9	0.40	11	22 49.3	4 13 53.53	19 51 41.6	7.7	2.9	0.20
27	23 52.8	2 20 6.04	14 43 30.0	15.6	5.9	0.40	12	22 53.0	4 21 30.51	20 21 39.1	7.5	2.9	0.20
28	23 46.7	2 17 56.78	14 14 43.7	15.7	5.9	0.40	13	22 56.9	4 29 21.18	20 50 50.7	7.4	2.8	0.19
29	23 40.7	2 15 50.76	13 45 52.7	15.7	5.9	0.40	14	23 1.0	4 37 25.42	21 19 5.1	7.3	2.8	0.19
30	23 34.8	2 13 50.27	+13 17 20.0	15.8	6.0	0.40	15	23 5.4	4 45 42.92	+21 46 10.5	7.2	2.7	0.19
May 1	23 28.9	2 11 57.43	12 49 28.1	15.7	6.0	0.40	16	23 9.9	4 54 13.26	22 11 54.7	7.1	2.7	0.19
2	23 23.3	2 10 14.14	12 22 37.3	15.6	5.9	0.39	17	23 14.6	5 2 55.87	22 36 5.3	7.1	2.7	0.19
3	23 17.8	2 8 42.03	11 57 6.6	15.5	5.9	0.39	18	23 19.6	5 11 49.98	22 58 30.0	7.0	2.6	0.19
4	23 12.6	2 7 22.47	11 33 12.7	15.4	5.8	0.39	19	23 24.7	5 20 54.64	23 18 56.5	6.9	2.6	0.19
5	23 7.6	2 6 16.61	+11 11 9.6	15.3	5.7	0.39	20	23 30.0	5 30 8.73	+23 37 13.6	6.9	2.6	0.19
6	23 2.8	2 5 25.37	10 51 9.5	15.1	5.7	0.38	21	23 35.4	5 39 30.95	23 53 10.5	6.8	2.6	0.19
7	22 58.2	2 4 49.43	10 33 21.6	14.9	5.6	0.38	22	23 40.9	5 48 59.83	24 6 38.0	6.8	2.6	0.18
8	22 54.0	2 4 29.26	10 17 53.4	14.7	5.5	0.37	23	23 46.6	5 58 33.78	24 17 27.9	6.7	2.5	0.18
9	22 50.0	2 4 25.15	10 4 49.9	14.4	5.4	0.37	24	23 52.2	6 8 11.15	24 25 33.8	6.7	2.5	0.18
10	22 46.2	2 4 37.25	+9 54 13.7	14.2	5.4	0.36	25	23 57.9	6 17 50.23	+24 30 51.7	6.7	2.5	0.18
11	22 42.8	2 5 5.56	9 46 6.6	14.0	5.3	0.36	27	0 3.6	6 27 20.26	24 33 18.9	6.7	2.5	0.18
12	22 39.6	2 5 40.98	9 40 28.4	13.7	5.2	0.35	28	0 9.3	6 37 6.56	24 32 55.2	6.7	2.5	0.18
13	22 36.7	2 6 50.32	9 37 17.3	13.5	5.1	0.35	29	0 14.9	6 46 40.56	24 29 42.0	6.6	2.5	0.18
14	22 34.0	2 8 6.34	9 36 30.9	13.2	5.0	0.34	30	0 20.4	6 56 9.80	24 23 42.0	6.7	2.5	0.18
15	22 31.6	2 9 37.73	+9 38 6.1	13.0	4.9	0.33	31	0 25.8	7 5 32.94	+24 14 50.9	6.7	2.5	0.18
16	22 29.4	2 11 24.16	+9 41 58.9	12.7	4.8	0.33	32	0 31.1	7 14 48.80	+24 3 41.7	6.7	2.5	0.18

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
July 1	h m	h m s	° ' "	"	"	s	Aug. 16	h m	h m s	° ' "	"	"	s
2	0 25.8	7 532.94	+24 14 59.9	6.7	2.5	0.18	17	1 29.5	11 10 44.90	+1 28 22.4	11.9	4.5	0.29
3	0 31.1	7 14 48.80	24 3 41.7	6.7	2.5	0.18	18	1 26.2	11 11 25.22	1 13 33.9	12.1	4.6	0.29
4	0 36.3	7 23 56.34	23 49 54.0	6.7	2.5	0.18	19	1 22.7	11 11 47.52	1 1 11.4	12.3	4.7	0.30
5	0 41.3	7 32 54.73	23 33 44.5	6.8	2.5	0.18	20	1 18.8	11 11 51.20	0 51 25.3	12.5	4.7	0.31
6	0 46.2	7 41 43.30	23 15 21.4	6.8	2.6	0.18	21	1 14.6	11 11 35.70	0 44 26.3	12.7	4.8	0.31
7	0 50.9	7 50 21.49	+22 54 53.1	6.8	2.6	0.18	22	1 10.1	11 11 0.57	+0 40 24.7	12.9	4.9	0.32
8	0 55.4	7 58 48.87	22 32 27.8	6.9	2.6	0.18	23	1 5.3	11 10 5.54	0 39 29.9	13.1	4.9	0.32
9	0 59.7	8 7 5.17	22 8 14.2	6.9	2.6	0.18	24	1 0.1	11 8 50.53	0 41 50.1	13.3	5.0	0.33
10	1 3.8	8 15 10.20	21 42 20.9	7.0	2.6	0.19	25	0 54.5	11 7 15.74	0 47 33.1	13.5	5.1	0.33
11	1 7.7	8 23 3.83	21 14 56.2	7.1	2.7	0.19	26	0 48.7	11 5 21.70	0 56 43.9	13.7	5.2	0.33
12	1 11.5	8 30 46.07	+20 46 7.9	7.1	2.7	0.19	27	0 42.6	11 3 9.29	+1 9 24.7	13.8	5.2	0.34
13	1 15.1	8 38 16.94	20 16 3.7	7.2	2.7	0.19	28	0 36.2	11 0 39.87	1 25 34.5	13.9	5.2	0.34
14	1 18.4	8 45 36.50	19 44 51.1	7.3	2.7	0.19	29	0 29.5	10 57 55.28	1 45 8.2	14.0	5.3	0.34
15	1 21.6	8 52 44.84	19 12 36.9	7.3	2.8	0.19	30	0 22.6	10 54 57.83	2 7 56.1	14.1	5.3	0.35
16	1 24.6	8 59 42.12	18 39 28.0	7.4	2.8	0.19	31	0 15.6	10 51 50.33	2 33 43.7	14.1	5.3	0.35
17	1 27.4	9 6 28.50	+18 53 0.7	7.5	2.8	0.19	Sept. 1	0 8.4	10 48 36.08	+3 2 10.7	14.0	5.2	0.35
18	1 30.1	9 13 4.14	17 30 51.0	7.6	2.9	0.20	2	0 1.2	10 45 18.84	3 32 51.9	14.0	5.2	0.35
19	1 32.6	9 19 29.21	16 55 34.9	7.6	2.9	0.20	3	23 54.0	10 42 2.71	4 5 17.8	13.9	5.2	0.35
20	1 34.9	9 25 43.85	16 19 47.7	7.7	2.9	0.20	4	23 46.9	10 38 52.06	4 38 54.4	13.8	5.2	0.35
21	1 37.0	9 31 48.23	15 43 34.8	7.8	3.0	0.20	5	23 40.0	10 35 51.35	5 13 5.2	13.7	5.1	0.34
22	1 38.9	9 37 42.50	+15 7 1.2	7.9	3.0	0.20	6	23 33.3	10 33 4.98	+5 47 11.8	13.5	5.1	0.34
23	1 40.6	9 43 26.81	14 30 11.7	8.0	3.0	0.20	7	23 26.9	10 30 37.19	6 20 35.9	13.2	5.0	0.33
24	1 42.2	9 49 1.28	13 53 11.0	8.1	3.1	0.21	8	23 20.9	10 28 31.88	6 52 39.7	12.9	4.9	0.33
25	1 43.7	9 54 26.00	13 16 3.8	8.3	3.1	0.21	9	23 15.3	10 26 52.54	7 22 47.8	12.6	4.8	0.32
26	1 45.0	9 59 41.05	12 38 54.3	8.4	3.2	0.21	10	23 10.2	10 25 42.09	7 50 28.0	12.3	4.7	0.31
27	1 46.1	10 4 46.52	+12 14 6.9	8.5	3.2	0.21	11	23 5.6	10 25 2.85	+8 15 12.0	12.0	4.6	0.31
28	1 47.1	10 9 42.41	11 24 46.0	8.6	3.3	0.21	12	23 1.6	10 24 56.56	8 36 35.6	11.6	4.4	0.30
29	1 48.0	10 14 28.73	10 47 55.7	8.8	3.3	0.22	13	22 58.1	10 25 24.22	8 54 18.7	11.3	4.3	0.29
30	1 48.7	10 19 5.47	10 11 20.1	8.9	3.4	0.22	14	22 55.2	10 26 26.30	9 8 5.9	11.0	4.1	0.28
31	1 49.2	10 23 32.59	9 35 3.6	9.0	3.4	0.22	15	22 52.9	10 28 2.62	9 17 46.1	10.7	4.0	0.27
Aug. 1	1 49.5	10 27 49.99	+8 59 10.6	9.1	3.5	0.22	16	22 51.1	10 30 12.44	+9 23 12.3	10.4	3.9	0.26
2	1 49.7	10 31 57.56	8 23 45.7	9.3	3.5	0.23	17	22 49.9	10 32 54.57	9 24 21.0	10.0	3.8	0.25
3	1 49.8	10 35 55.13	7 48 53.0	9.4	3.6	0.23	18	22 49.1	10 36 7.37	9 21 12.6	9.7	3.7	0.24
4	1 49.7	10 39 42.52	7 14 37.0	9.6	3.6	0.24	19	22 48.9	10 39 48.87	9 13 51.0	9.4	3.6	0.23
5	1 49.3	10 43 19.49	6 41 2.9	9.7	3.7	0.24	20	22 49.1	10 43 56.83	9 2 22.9	9.1	3.5	0.22
6	1 48.8	10 46 45.77	+6 8 15.6	9.9	3.7	0.24	21	22 49.7	10 48 28.85	+8 46 57.7	8.9	3.4	0.22
7	1 48.1	10 50 1.03	5 36 20.3	10.0	3.8	0.25	22	22 50.6	10 53 22.37	8 27 47.4	8.6	3.3	0.21
8	1 47.2	10 53 4.92	5 5 22.7	10.2	3.9	0.25	23	22 51.9	10 58 34.86	8 5 5.3	8.4	3.2	0.21
9	1 46.1	10 55 57.01	4 35 23.7	10.4	3.9	0.26	24	22 53.4	11 4 3.76	7 39 6.5	8.2	3.1	0.20
10	1 44.9	10 58 36.87	4 6 44.4	10.5	4.0	0.26	25	22 55.2	11 9 46.60	7 10 7.2	8.0	3.0	0.20
11	1 43.5	11 1 3.97	+3 39 16.5	10.7	4.1	0.26	26	22 57.1	11 15 41.11	+6 38 24.1	7.8	3.0	0.19
12	1 41.8	11 3 17.76	3 13 12.1	10.9	4.1	0.27	27	22 59.3	11 21 45.17	6 4 14.3	7.7	2.9	0.19
13	1 39.8	11 5 17.62	2 48 38.6	11.1	4.2	0.27	28	23 1.5	11 27 56.84	5 27 54.5	7.5	2.8	0.18
14	1 37.6	11 7 2.95	2 25 44.1	11.3	4.3	0.28	29	23 3.9	11 34 14.41	4 49 40.8	7.4	2.8	0.18
15	1 35.2	11 8 33.06	2 4 37.2	11.5	4.3	0.28	30	23 6.3	11 40 36.38	4 9 48.9	7.2	2.7	0.18
16	1 32.5	11 9 47.28	+1 45 26.8	11.7	4.4	0.28	31	23 8.7	11 47 1.48	+3 28 33.4	7.1	2.7	0.18
17	1 29.5	11 10 44.90	+1 28 22.4	11.9	4.5	0.29							

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	23 13.8	11 59 56.90	+ 2 244.8	6.9	2.6	0.17	Nov. 17	0 58.7	16 46 28.62	-24 41 13.4	7.0	2.6	0.19
2	23 16.3	12 6 25.55	1 18 35.8	6.8	2.6	0.17	18	1 0.9	16 52 39.10	24 54 19.4	7.1	2.7	0.19
3	23 18.8	12 12 53.95	+ 0 33 51.2	6.7	2.6	0.17	19	1 3.1	16 58 47.45	25 6 5.9	7.2	2.7	0.19
4	23 21.3	12 19 21.72	- 0 11 19.8	6.7	2.6	0.17	20	1 5.2	17 4 53.08	25 16 31.4	7.3	2.7	0.20
5	23 23.8	12 25 46.50	0 56 48.8	6.6	2.6	0.16	21	1 7.3	17 10 55.37	25 25 34.5	7.4	2.8	0.20
6	23 26.3	12 32 14.00	- 1 42 28.3	6.6	2.5	0.16	22	1 9.3	17 16 53.57	-25 33 14.1	7.5	2.8	0.20
7	23 28.8	12 38 38.05	2 28 11.6	6.5	2.5	0.16	23	1 11.3	17 22 46.84	25 39 29.2	7.6	2.9	0.20
8	23 31.2	12 45 0.53	3 13 52.6	6.5	2.5	0.16	24	1 13.1	17 28 34.22	25 44 18.9	7.7	2.9	0.21
9	23 33.6	12 51 21.38	3 59 26.3	6.4	2.5	0.16	25	1 14.8	17 34 14.50	25 47 42.5	7.9	3.0	0.21
10	23 35.9	12 57 40.61	4 44 48.1	6.4	2.4	0.15	26	1 16.4	17 39 46.71	25 49 39.5	8.0	3.0	0.22
11	23 38.3	13 3 58.26	- 5 29 53.7	6.4	2.4	0.15	27	1 17.8	17 45 9.17	-25 50 9.6	8.2	3.1	0.22
12	23 40.6	13 10 14.35	6 14 39.4	6.3	2.4	0.15	28	1 19.1	17 50 20.36	25 49 12.8	8.4	3.1	0.23
13	23 42.9	13 16 28.98	6 59 1.9	6.3	2.4	0.15	29	1 20.1	17 55 18.47	25 46 49.8	8.6	3.2	0.23
14	23 45.2	13 22 42.25	7 42 58.3	6.3	2.4	0.15	30	1 20.9	18 0 1.47	25 43 1.4	8.7	3.2	0.24
15	23 47.4	13 28 54.26	8 26 25.9	6.3	2.4	0.15	Dec. 1	1 21.4	18 4 27.06	25 37 48.9	8.9	3.3	0.24
16	23 49.7	13 35 5.14	- 9 9 22.3	6.2	2.4	0.15	2	1 21.5	18 8 32.71	-25 31 14.1	9.1	3.4	0.25
17	23 51.9	13 41 15.00	9 51 45.4	6.2	2.3	0.15	3	1 21.3	18 12 15.61	25 23 19.2	9.3	3.5	0.25
18	23 54.1	13 47 23.99	10 33 33.2	6.2	2.3	0.15	4	1 20.6	18 15 32.69	25 14 7.0	9.6	3.6	0.26
19	23 56.3	13 53 32.24	11 14 43.8	6.2	2.3	0.15	5	1 19.5	18 18 20.65	25 3 40.6	9.8	3.7	0.26
20	23 58.4	13 59 39.88	11 55 15.6	6.2	2.3	0.15	6	1 17.8	18 20 35.98	24 52 3.7	10.1	3.8	0.27
22	0 0.6	14 5 47.06	-12 35 6.9	6.2	2.3	0.15	7	1 15.5	18 22 15.04	-24 39 20.3	10.4	3.9	0.28
23	0 2.8	14 11 53.90	13 14 16.2	6.2	2.3	0.15	8	1 12.6	18 23 14.23	24 25 34.6	10.7	4.0	0.29
24	0 4.9	14 18 0.55	13 52 42.2	6.2	2.3	0.15	9	1 8.9	18 23 30.12	24 10 50.8	11.0	4.1	0.29
25	0 7.1	14 24 7.11	14 30 23.5	6.2	2.3	0.16	10	1 4.5	18 22 59.75	23 55 13.1	11.3	4.3	0.30
26	0 9.3	14 30 13.71	15 7 18.7	6.2	2.3	0.16	11	0 59.3	18 21 40.87	23 38 45.8	11.6	4.4	0.31
27	0 11.4	14 36 20.46	-15 43 26.5	6.2	2.3	0.16	12	0 53.2	18 19 32.39	-23 21 33.5	11.9	4.5	0.32
28	0 13.6	14 42 27.47	16 18 45.7	6.2	2.3	0.16	13	0 46.3	18 16 34.72	23 3 41.4	12.2	4.6	0.32
29	0 15.8	14 48 34.83	16 53 15.1	6.2	2.4	0.16	14	0 38.6	18 12 50.14	22 45 15.5	12.4	4.7	0.33
30	0 18.0	14 54 42.63	17 26 53.3	6.3	2.4	0.16	15	0 30.2	18 8 23.08	22 26 24.0	12.7	4.8	0.33
31	0 20.1	15 0 50.94	17 59 39.1	6.3	2.4	0.16	16	0 21.3	18 3 20.21	22 7 18.8	12.9	4.9	0.33
Nov. 1	0 22.3	15 6 59.83	-18 31 31.3	6.3	2.4	0.16	17	0 11.9	17 57 50.34	-21 48 14.7	13.0	4.9	0.34
2	0 24.5	15 13 9.35	19 2 28.5	6.3	2.4	0.16	18	0 2.2	17 52 3.87	21 29 32.1	13.1	5.0	0.34
3	0 26.8	15 19 19.54	19 32 29.4	6.3	2.4	0.16	18	23 52.4	17 46 12.22	21 11 33.9	13.0	4.9	0.34
4	0 29.0	15 25 30.43	20 1 32.8	6.4	2.4	0.16	19	23 42.7	17 40 26.89	20 54 44.6	12.9	4.9	0.34
5	0 31.2	15 31 42.03	20 29 37.3	6.4	2.4	0.17	20	23 33.3	17 34 58.68	20 39 30.3	12.9	4.8	0.34
6	0 33.5	15 37 54.31	-20 56 41.5	6.4	2.4	0.17	21	23 24.4	17 29 56.97	-20 26 14.1	12.8	4.8	0.34
7	0 35.8	15 44 7.26	21 22 44.0	6.5	2.4	0.17	22	23 16.0	17 25 29.23	20 15 14.8	12.7	4.7	0.33
8	0 38.1	15 50 20.83	21 47 43.5	6.5	2.5	0.17	23	23 8.3	17 21 40.81	20 6 44.5	12.5	4.7	0.33
9	0 40.4	15 56 34.93	22 11 38.5	6.5	2.5	0.18	24	23 1.3	17 18 34.96	20 0 49.9	12.2	4.6	0.32
10	0 42.6	16 2 49.46	22 34 27.3	6.6	2.5	0.18	25	22 55.0	17 16 13.11	19 57 30.9	11.9	4.5	0.32
11	0 44.9	16 9 4.30	-22 56 8.5	6.6	2.5	0.18	26	22 49.4	17 14 35.18	-19 56 42.1	11.6	4.4	0.31
12	0 47.2	16 15 19.30	23 16 40.8	6.7	2.5	0.18	27	22 44.5	17 13 39.97	19 58 13.5	11.4	4.3	0.30
13	0 49.5	16 21 34.27	23 36 2.6	6.7	2.5	0.18	28	22 40.4	17 13 25.41	20 1 52.1	11.1	4.2	0.30
14	0 51.8	16 27 48.98	23 54 12.3	6.8	2.6	0.18	29	22 36.8	17 13 49.00	20 7 23.3	10.8	4.1	0.29
15	0 54.1	16 34 3.17	24 11 8.4	6.8	2.6	0.19	30	22 33.9	17 14 47.94	20 14 31.3	10.5	4.0	0.28
16	0 56.4	16 40 16.51	-24 26 49.3	6.9	2.6	0.19	31	22 31.5	17 16 19.33	-20 22 59.7	10.2	3.9	0.27
17	0 58.7	16 46 28.62	-24 41 13.4	7.0	2.6	0.19	32	22 29.6	17 18 20.35	-20 32 33.5	10.0	3.8	0.26

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
Jan. 0	h m	h m s	° ' "	"	"	"	Feb. 15	h m	h m s	° ' "	"	"	"
1	21 55.0	16 40 40.31	-20 53 26.6	6.4	0.2	0.44	16	22 58.4	20 45 43.68	-18 44 7.0	5.6	5.4	0.38
2	21 56.3	16 45 55.14	21 5 29.2	6.4	6.2	0.44	17	22 59.6	20 50 50.40	18 26 18.0	5.6	5.4	0.38
3	21 57.6	16 51 10.93	21 16 55.8	6.4	6.2	0.44	18	23 0.8	20 55 55.99	18 7 57.2	5.6	5.4	0.38
4	21 58.9	16 56 27.63	21 27 46.1	6.3	6.1	0.44	19	23 1.9	21 1 0.45	17 49 5.2	5.6	5.4	0.38
5	22 0.2	17 1 45.20	21 37 59.3	6.3	6.1	0.44	20	23 3.0	21 6 3.76	17 29 42.7	5.6	5.4	0.37
6	22 1.6	17 7 3.60	-21 47 35.0	6.3	6.1	0.44	21	23 4.1	21 11 5.91	-17 9 50.5	5.5	5.3	0.37
7	22 3.0	17 12 22.80	21 56 32.6	6.3	6.1	0.44	22	23 5.2	21 16 6.90	16 49 29.2	5.5	5.3	0.37
8	22 4.4	17 17 42.75	22 4 51.7	6.3	6.1	0.43	23	23 6.2	21 21 6.74	16 28 39.5	5.5	5.3	0.37
9	22 5.8	17 23 3.39	22 12 32.0	6.2	6.0	0.43	24	23 7.3	21 26 5.42	16 7 22.1	5.5	5.3	0.37
10	22 7.2	17 28 24.68	22 19 33.0	6.2	6.0	0.43	25	23 8.3	21 31 2.96	15 45 37.7	5.5	5.3	0.37
11	22 8.6	17 33 46.56	-22 25 54.4	6.2	6.0	0.43	26	23 9.3	21 35 59.36	-15 23 26.9	5.5	5.3	0.37
12	22 10.1	17 39 9.00	22 31 35.7	6.2	6.0	0.43	27	23 10.3	21 40 54.63	15 0 50.4	5.5	5.3	0.37
13	22 11.5	17 44 31.94	22 36 36.7	6.1	5.9	0.43	28	23 11.3	21 45 48.78	14 37 49.0	5.5	5.3	0.36
14	22 12.9	17 49 55.31	22 40 57.0	6.1	5.9	0.43	29	23 12.2	21 50 41.83	14 14 23.5	5.5	5.3	0.36
15	22 14.3	17 55 19.04	22 44 36.4	6.1	5.9	0.43	Mar. 1	23 13.1	21 55 33.80	13 50 34.5	5.4	5.3	0.36
16	22 15.8	18 0 43.10	-22 47 34.8	6.1	5.9	0.43	2	23 14.0	22 0 24.09	-13 26 22.7	5.4	5.2	0.36
17	22 17.3	18 6 7.41	22 49 52.0	6.1	5.9	0.42	3	23 14.9	22 5 14.55	13 1 48.9	5.4	5.2	0.36
18	22 18.8	18 11 31.92	22 51 27.6	6.0	5.8	0.42	4	23 15.7	22 10 3.39	12 36 53.9	5.4	5.2	0.36
19	22 20.2	18 16 56.56	22 52 21.6	6.0	5.8	0.42	5	23 16.6	22 14 51.22	12 11 38.3	5.4	5.2	0.36
20	22 21.7	18 22 21.28	22 52 34.0	6.0	5.8	0.42	6	23 17.4	22 19 38.08	11 46 2.9	5.4	5.2	0.36
21	22 23.1	18 27 46.02	-22 52 4.7	6.0	5.8	0.42	7	23 18.3	22 24 23.97	-11 20 8.4	5.4	5.2	0.35
22	22 24.6	18 33 10.71	22 50 53.6	6.0	5.8	0.42	8	23 19.1	22 29 8.93	10 53 55.5	5.4	5.2	0.35
23	22 26.0	18 38 35.30	22 49 0.8	6.0	5.7	0.42	9	23 19.9	22 33 52.99	10 27 25.0	5.4	5.2	0.35
24	22 27.5	18 43 59.73	22 46 26.2	5.9	5.7	0.42	10	23 20.7	22 38 36.16	10 0 37.7	5.4	5.2	0.35
25	22 28.9	18 49 23.95	22 43 9.8	5.9	5.7	0.41	11	23 21.4	22 43 18.48	9 33 34.3	5.4	5.2	0.35
26	22 30.4	18 54 47.89	-22 39 12.0	5.9	5.7	0.41	12	23 22.1	22 47 59.97	-9 6 15.6	5.3	5.2	0.35
27	22 31.8	19 0 11.51	22 34 32.8	5.9	5.7	0.41	13	23 22.8	22 52 40.66	8 38 42.3	5.3	5.2	0.35
28	22 33.3	19 5 34.76	22 29 12.3	5.9	5.7	0.41	14	23 23.5	22 57 20.60	8 10 55.1	5.3	5.1	0.35
29	22 34.7	19 10 57.56	22 23 10.7	5.9	5.7	0.41	15	23 24.2	23 1 59.80	7 42 54.8	5.3	5.1	0.35
30	22 36.2	19 16 19.88	22 16 28.3	5.8	5.6	0.41	16	23 24.9	23 6 38.31	7 14 42.2	5.3	5.1	0.34
31	22 37.6	19 21 41.67	-22 9 5.3	5.8	5.6	0.40	17	23 25.6	23 11 16.15	-6 46 18.0	5.3	5.1	0.34
Feb. 1	22 39.0	19 27 2.88	22 1 2.0	5.8	5.6	0.40	18	23 26.3	23 15 53.35	6 17 42.8	5.3	5.1	0.34
2	22 40.4	19 32 23.47	21 52 18.7	5.8	5.6	0.40	19	23 27.0	23 20 29.95	5 48 57.4	5.3	5.1	0.34
3	22 41.8	19 37 43.40	21 42 55.7	5.8	5.6	0.40	20	23 27.7	23 25 5.99	5 20 2.5	5.3	5.1	0.34
4	22 43.2	19 43 2.62	21 32 53.4	5.8	5.6	0.40	21	23 28.4	23 29 41.51	4 50 58.9	5.3	5.1	0.34
5	22 44.5	19 48 21.08	-21 22 12.1	5.7	5.6	0.40	22	23 29.0	23 34 16.53	-4 21 47.4	5.3	5.1	0.34
6	22 45.9	19 53 38.74	21 10 52.4	5.7	5.5	0.39	23	23 29.6	23 38 51.11	3 52 28.6	5.3	5.1	0.34
7	22 47.2	19 58 55.56	20 58 54.6	5.7	5.5	0.39	24	23 30.2	23 43 25.27	3 23 3.3	5.2	5.1	0.34
8	22 48.5	20 4 11.50	20 46 19.2	5.7	5.5	0.39	25	23 30.8	23 47 59.07	2 53 32.2	5.2	5.1	0.34
9	22 49.8	20 9 26.53	20 33 6.7	5.7	5.5	0.39	26	23 31.4	23 52 32.54	2 23 55.9	5.2	5.1	0.34
10	22 51.1	20 14 40.63	-20 19 17.7	5.7	5.5	0.39	27	23 32.0	23 57 5.73	-1 54 15.2	5.2	5.0	0.34
11	22 52.4	20 19 53.75	20 4 52.7	5.7	5.5	0.39	28	23 32.7	0 1 38.67	1 24 30.8	5.2	5.0	0.34
12	22 53.7	20 25 5.86	19 49 52.3	5.6	5.5	0.39	29	23 33.3	0 6 11.41	0 54 43.3	5.2	5.0	0.34
13	22 54.9	20 30 16.92	19 34 16.9	5.6	5.4	0.38	30	23 33.9	0 10 43.99	-0 24 53.4	5.2	5.0	0.34
14	22 56.1	20 35 26.91	19 18 7.2	5.6	5.4	0.38	31	23 34.5	0 15 16.47	+ 0 4 58.1	5.2	5.0	0.34
15	22 57.2	20 40 35.84	-19 1 23.7	5.6	5.4	0.38	32	23 35.1	0 19 48.88	+ 0 34 50.5	5.2	5.0	0.34
	22 58.4	20 45 43.68	-18 44 7.0	5.6	5.4	0.38	33	23 35.7	0 24 21.27	+ 1 4 43.0	5.2	5.0	0.34

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	23 35.1	0 19 48.88	+ 0 34 50.5	5.2	5.0	0.34	May 18	0 11.9	3 58 8.36	+20 16 46.9	5.1	5.0	0.35
2	23 35.7	0 24 21.27	1 4 43.0	5.2	5.0	0.34	19	0 13.1	4 3 15.45	20 33 43.4	5.1	5.0	0.35
3	23 36.2	0 28 53.67	1 34 35.0	5.2	5.0	0.33	20	0 14.3	4 8 23.61	20 50 6.1	5.1	5.0	0.35
4	23 36.8	0 33 26.14	2 4 25.7	5.2	5.0	0.33	21	0 15.5	4 13 32.82	21 5 54.6	5.1	5.0	0.35
5	23 37.4	0 37 58.70	2 34 14.6	5.2	5.0	0.33	22	0 16.8	4 18 43.06	21 21 8.1	5.1	5.0	0.35
6	23 38.0	0 42 31.41	+ 3 4 1.0	5.2	5.0	0.33	23	0 18.0	4 23 54.31	+21 35 46.0	5.1	5.0	0.36
7	23 38.6	0 47 4.30	3 33 43.9	5.2	5.0	0.33	24	0 19.3	4 29 6.54	21 49 47.6	5.1	5.0	0.36
8	23 39.2	0 51 37.41	4 3 22.7	5.2	5.0	0.33	25	0 20.5	4 34 19.73	22 3 12.4	5.1	5.0	0.36
9	23 39.8	0 56 10.80	4 32 56.6	5.2	5.0	0.33	26	0 21.8	4 39 33.84	22 15 59.8	5.1	5.0	0.36
10	23 40.4	1 0 44.51	5 2 25.0	5.2	5.0	0.33	27	0 23.1	4 44 48.84	22 28 9.4	5.1	5.0	0.36
11	23 41.1	1 5 18.56	+ 5 31 47.3	5.2	5.0	0.33	28	0 24.4	4 50 4.70	+22 39 40.7	5.2	5.0	0.36
12	23 41.7	1 9 52.99	6 1 2.6	5.2	5.0	0.33	29	0 25.7	4 55 21.38	22 50 33.1	5.2	5.0	0.36
13	23 42.3	1 14 27.83	6 30 10.2	5.1	5.0	0.33	30	0 27.1	5 0 38.86	23 0 46.2	5.2	5.0	0.36
14	23 42.9	1 19 3.13	6 59 9.3	5.1	5.0	0.33	31	0 28.4	5 5 57.08	23 10 19.4	5.2	5.0	0.36
15	23 43.6	1 23 38.92	7 27 59.3	5.1	5.0	0.33	June 1	0 29.8	5 11 16.00	23 19 12.5	5.2	5.0	0.36
16	23 44.2	1 28 15.24	+ 7 56 39.4	5.1	5.0	0.33	2	0 31.2	5 16 35.58	+23 27 25.0	5.2	5.0	0.36
17	23 44.9	1 32 52.12	8 25 8.7	5.1	5.0	0.33	3	0 32.6	5 21 55.78	23 34 56.6	5.2	5.0	0.36
18	23 45.6	1 37 29.61	8 53 26.7	5.1	5.0	0.33	4	0 34.0	5 27 16.53	23 41 46.9	5.2	5.0	0.36
19	23 46.4	1 42 7.73	9 21 32.6	5.1	5.0	0.33	5	0 35.4	5 32 37.79	23 47 55.5	5.2	5.0	0.37
20	23 47.1	1 46 46.51	9 49 25.7	5.1	5.0	0.33	6	0 36.8	5 37 59.50	23 53 22.2	5.2	5.0	0.37
21	23 47.8	1 51 26.00	+10 17 5.3	5.1	5.0	0.34	7	0 38.2	5 43 21.62	+23 58 6.8	5.2	5.0	0.37
22	23 48.5	1 56 6.24	10 44 30.5	5.1	5.0	0.34	8	0 39.6	5 48 44.09	24 2 9.0	5.2	5.0	0.37
23	23 49.3	2 0 47.24	11 11 40.7	5.1	5.0	0.34	9	0 41.0	5 54 6.83	24 5 28.6	5.2	5.0	0.37
24	23 50.0	2 5 29.05	11 38 35.2	5.1	5.0	0.34	10	0 42.4	5 59 29.80	24 8 5.4	5.2	5.0	0.37
25	23 50.8	2 10 11.70	12 5 13.2	5.1	5.0	0.34	11	0 43.9	6 4 52.92	24 9 59.3	5.2	5.0	0.37
26	23 51.6	2 14 55.21	+12 31 33.9	5.1	4.9	0.34	12	0 45.3	6 10 16.15	+24 11 10.2	5.2	5.1	0.37
27	23 52.4	2 19 39.62	12 57 36.7	5.1	4.9	0.34	13	0 46.8	6 15 39.41	24 11 38.1	5.2	5.1	0.37
28	23 53.2	2 24 24.96	13 23 20.8	5.1	4.9	0.34	14	0 48.2	6 21 2.64	24 11 22.9	5.2	5.1	0.37
29	23 54.0	2 29 11.26	13 48 45.4	5.1	4.9	0.34	15	0 49.7	6 26 25.77	24 10 24.5	5.3	5.1	0.37
30	23 54.8	2 33 58.54	14 13 49.9	5.1	4.9	0.34	16	0 51.1	6 31 48.76	24 8 43.1	5.3	5.1	0.37
May 1	23 55.7	2 38 46.82	+14 38 33.4	5.1	4.9	0.34	17	0 52.6	6 37 11.53	+24 6 18.6	5.3	5.1	0.37
2	23 56.6	2 43 36.13	15 2 55.2	5.1	4.9	0.34	18	0 54.0	6 42 34.01	24 3 11.2	5.3	5.1	0.37
3	23 57.5	2 48 26.49	15 26 54.7	5.1	4.9	0.34	19	0 55.4	6 47 56.16	23 59 20.9	5.3	5.1	0.37
4	23 58.4	2 53 17.92	15 50 31.1	5.1	4.9	0.34	20	0 56.8	6 53 17.90	23 54 47.9	5.3	5.1	0.37
5	23 59.3	2 58 10.45	16 13 43.6	5.1	4.9	0.34	21	0 58.3	6 58 39.17	23 49 32.4	5.3	5.1	0.37
7	0 0.2	3 3 4.07	+16 36 31.5	5.1	4.9	0.34	22	0 59.7	7 3 59.93	+23 43 34.6	5.3	5.1	0.37
8	0 1.2	3 7 58.80	16 58 54.2	5.1	4.9	0.34	23	1 1.1	7 9 20.11	23 36 54.8	5.3	5.1	0.37
9	0 2.3	3 12 54.65	17 20 50.8	5.1	4.9	0.34	24	1 2.5	7 14 39.66	23 29 33.3	5.3	5.1	0.37
10	0 3.2	3 17 51.64	17 42 20.5	5.1	4.9	0.35	25	1 3.8	7 19 58.53	23 21 30.3	5.3	5.2	0.37
11	0 4.2	3 22 49.76	18 3 22.7	5.1	4.9	0.35	26	1 5.2	7 25 16.66	23 12 46.1	5.3	5.2	0.37
12	0 5.3	3 27 49.03	+18 23 56.5	5.1	4.9	0.35	27	1 6.5	7 30 34.03	+23 3 21.1	5.4	5.2	0.37
13	0 6.3	3 32 49.43	18 44 1.4	5.1	4.9	0.35	28	1 7.8	7 35 50.58	22 53 15.7	5.4	5.2	0.37
14	0 7.4	3 37 50.97	19 3 36.6	5.1	4.9	0.35	29	1 9.1	7 41 6.26	22 42 30.2	5.4	5.2	0.37
15	0 8.5	3 42 53.64	19 22 41.5	5.1	4.9	0.35	30	1 10.4	7 46 21.02	22 31 5.1	5.4	5.2	0.37
16	0 9.6	3 47 57.43	19 41 15.3	5.1	4.9	0.35	31	1 11.7	7 51 34.85	22 19 0.9	5.4	5.2	0.38
17	0 10.7	3 53 2.35	+19 59 17.3	5.1	5.0	0.35	32	1 13.0	7 56 47.70	+22 6 18.1	5.4	5.2	0.38
18	0 11.9	3 58 8.36	+20 16 46.9	5.1	5.0	0.35	33	1 14.2	8 1 59.55	+21 52 57.1	5.4	5.2	0.38



## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
July 1	1 11.7	7 51 34.85	+22 19 0.9	5.4	5.2	0.38	Aug. 16	1 50.5	11 31 45.90	+ 4 18 53.4	6.1	5.9	0.40
2	1 13.0	7 56 47.70	22 6 18.1	5.4	5.2	0.38	17	1 51.0	11 36 11.26	3 48 23.0	6.2	6.0	0.40
3	1 14.2	8 1 59.55	21 52 57.1	5.4	5.2	0.38	18	1 51.4	11 40 36.16	3 17 46.2	6.2	6.0	0.40
4	1 15.5	8 7 10.35	21 38 58.4	5.4	5.2	0.38	19	1 51.9	11 45 0.64	2 47 3.6	6.2	6.0	0.40
5	1 16.7	8 12 20.07	21 24 22.5	5.4	5.2	0.38	20	1 52.3	11 49 24.74	2 16 15.9	6.2	6.0	0.40
6	1 17.8	8 17 28.63	+21 9 10.1	5.4	5.3	0.38	21	1 52.8	11 53 48.50	+ 1 45 23.8	6.3	6.0	0.40
7	1 19.0	8 22 36.18	20 53 21.7	5.5	5.3	0.38	22	1 53.2	11 58 11.97	1 14 28.1	6.3	6.1	0.40
8	1 20.2	8 27 42.50	20 36 58.0	5.5	5.3	0.38	23	1 53.7	12 2 35.19	0 43 29.5	6.3	6.1	0.41
9	1 21.3	8 32 47.65	20 19 59.5	5.5	5.3	0.38	24	1 54.1	12 6 58.19	+ 0 12 28.6	6.3	6.1	0.41
10	1 22.4	8 37 51.61	20 2 26.7	5.5	5.3	0.38	25	1 54.6	12 11 21.01	- 0 18 33.9	6.4	6.1	0.41
11	1 23.5	8 42 54.36	+19 44 20.4	5.5	5.3	0.38	26	1 55.0	12 15 43.72	- 0 49 37.4	6.4	6.2	0.41
12	1 24.6	8 47 55.89	19 25 41.3	5.5	5.3	0.38	27	1 55.5	12 20 6.35	1 20 41.1	6.4	6.2	0.41
13	1 25.7	8 52 56.17	19 6 29.9	5.5	5.3	0.38	28	1 55.9	12 24 28.94	1 51 44.5	6.4	6.2	0.41
14	1 26.8	8 57 55.19	18 46 47.0	5.5	5.4	0.38	29	1 56.3	12 28 51.55	2 22 46.9	6.5	6.2	0.42
15	1 27.9	9 2 52.95	18 26 33.3	5.6	5.4	0.38	30	1 56.7	12 33 14.21	2 53 47.3	6.5	6.3	0.42
16	1 28.8	9 7 40.44	+18 5 49.3	5.6	5.4	0.38	31	1 57.2	12 37 36.96	- 3 24 45.2	6.5	6.3	0.42
17	1 29.8	9 12 44.67	17 44 36.0	5.6	5.4	0.38	Sept. 1	1 57.6	12 41 59.83	3 55 39.9	6.6	6.3	0.42
18	1 30.8	9 17 38.63	17 22 53.9	5.6	5.4	0.38	2	1 58.1	12 46 22.89	4 26 30.7	6.6	6.4	0.42
19	1 31.7	9 22 31.32	17 0 43.7	5.6	5.4	0.38	3	1 58.5	12 50 46.18	4 57 16.9	6.6	6.4	0.43
20	1 32.6	9 27 22.74	16 38 6.2	5.6	5.4	0.38	4	1 59.0	12 55 9.73	5 27 57.9	6.6	6.4	0.43
21	1 33.5	9 32 12.91	+16 15 2.1	5.6	5.5	0.38	5	1 59.4	12 59 33.58	- 5 58 33.1	6.7	6.4	0.43
22	1 34.4	9 37 1.84	15 51 32.1	5.7	5.5	0.38	6	1 59.9	13 3 57.78	6 29 1.6	6.7	6.5	0.43
23	1 35.2	9 41 49.53	15 27 36.9	5.7	5.5	0.38	7	2 0.3	13 8 22.30	6 59 22.7	6.7	6.5	0.44
24	1 36.0	9 46 36.00	15 3 17.3	5.7	5.5	0.38	8	2 0.8	13 12 47.37	7 29 35.8	6.8	6.5	0.44
25	1 36.8	9 51 21.26	14 38 33.9	5.7	5.5	0.38	9	2 1.3	13 17 12.83	7 59 40.1	6.8	6.6	0.44
26	1 37.6	9 56 5.33	+14 13 27.4	5.7	5.5	0.38	10	2 1.8	13 21 38.79	- 8 29 34.8	6.8	6.6	0.44
27	1 38.4	10 0 48.24	13 47 58.7	5.7	5.5	0.38	11	2 2.3	13 26 5.27	8 59 19.3	6.9	6.6	0.45
28	1 39.1	10 5 30.01	13 22 8.5	5.8	5.6	0.38	12	2 2.8	13 30 32.30	9 28 53.0	6.9	6.6	0.45
29	1 39.8	10 10 10.67	12 55 57.4	5.8	5.6	0.38	13	2 3.3	13 34 59.93	9 58 15.0	6.9	6.7	0.45
30	1 40.5	10 14 50.24	12 29 26.1	5.8	5.6	0.38	14	2 3.8	13 39 28.19	10 27 24.5	7.0	6.7	0.46
31	1 41.2	10 19 28.75	+12 2 35.5	5.8	5.6	0.38	15	2 4.3	13 43 57.10	-10 56 20.8	7.0	6.7	0.46
Aug. 1	1 41.9	10 24 6.22	11 35 26.2	5.8	5.6	0.38	16	2 4.8	13 48 26.70	11 25 3.2	7.0	6.8	0.46
2	1 42.6	10 28 42.68	11 7 58.9	5.8	5.7	0.38	17	2 5.4	13 52 57.01	11 53 31.2	7.1	6.8	0.46
3	1 43.3	10 33 18.18	10 40 14.3	5.9	5.7	0.38	18	2 6.0	13 57 28.06	12 21 43.8	7.1	6.8	0.47
4	1 43.9	10 37 52.73	10 12 13.2	5.9	5.7	0.38	19	2 6.6	14 1 59.88	12 49 40.4	7.1	6.9	0.47
5	1 44.5	10 42 26.37	+ 9 43 56.3	5.9	5.7	0.39	20	2 7.2	14 6 32.49	-13 17 20.2	7.2	6.9	0.47
6	1 45.1	10 46 59.13	9 15 24.3	5.9	5.7	0.39	21	2 7.8	14 11 5.94	13 44 42.5	7.2	7.0	0.48
7	1 45.7	10 51 31.05	8 46 38.0	5.9	5.7	0.39	22	2 8.4	14 15 40.25	14 11 46.5	7.2	7.0	0.48
8	1 46.3	10 56 2.16	8 17 37.9	6.0	5.8	0.39	23	2 9.0	14 20 15.46	14 38 31.5	7.3	7.0	0.48
9	1 46.9	11 0 32.50	7 48 24.9	6.0	5.8	0.39	24	2 9.6	14 24 51.58	15 4 56.6	7.3	7.1	0.49
10	1 47.4	11 5 2.09	+ 7 18 59.8	6.0	5.8	0.39	25	2 10.3	14 29 28.63	-15 31 1.3	7.4	7.1	0.49
11	1 48.0	11 9 30.96	6 49 23.0	6.0	5.8	0.39	26	2 11.0	14 34 6.63	15 56 44.9	7.4	7.1	0.49
12	1 48.5	11 13 59.16	6 19 35.6	6.1	5.8	0.39	27	2 11.7	14 38 45.59	16 22 6.6	7.4	7.2	0.50
13	1 49.0	11 18 26.72	5 49 38.4	6.1	5.9	0.39	28	2 12.4	14 43 25.55	16 47 5.6	7.5	7.2	0.50
14	1 49.5	11 22 53.67	5 19 31.8	6.1	5.9	0.39	29	2 13.2	14 48 6.52	17 11 41.3	7.5	7.3	0.51
15	1 50.0	11 27 20.05	+ 4 49 16.6	6.1	5.9	0.40	30	2 14.0	14 52 48.52	-17 35 52.9	7.6	7.3	0.51
16	1 50.5	11 31 45.90	+ 4 18 53.4	6.1	5.9	0.40	31	2 14.8	14 57 31.57	-17 59 39.7	7.6	7.3	0.52

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m s	h m s	° ' "	"	"	s		h m s	h m s	° ' "	"	"	s
Oct. 1	2 14.9	14 57 31.57	-17 59 39.7	7.6	7.3	0.52	Nov. 16	3 2.9	18 47 8.56	-25 53 8.8	10.6	10.2	0.78
2	2 15.6	15 2 15.67	18 23 1.0	7.7	7.4	0.52	17	3 3.9	18 52 4.91	25 47 44.7	10.7	10.3	0.76
3	2 16.4	15 7 0.84	18 45 56.1	7.7	7.4	0.52	18	3 4.9	18 56 59.92	25 41 40.5	10.8	10.4	0.77
4	2 17.2	15 11 47.08	19 8 24.2	7.7	7.5	0.53	19	3 5.9	19 1 53.50	25 34 56.6	10.9	10.5	0.77
5	2 18.1	15 16 34.39	19 30 94.7	7.8	7.5	0.53	20	3 6.8	19 6 45.58	25 27 33.6	11.0	10.6	0.78
6	2 18.9	15 21 22.76	-19 51 56.9	7.8	7.6	0.54	21	3 7.7	19 11 36.08	-25 19 31.9	11.1	10.7	0.79
7	2 19.8	15 26 12.20	20 13 0.0	7.9	7.6	0.54	22	3 8.6	19 16 24.93	25 10 52.0	11.2	10.8	0.80
8	2 20.7	15 31 2.69	20 33 33.3	7.9	7.7	0.54	23	3 9.4	19 21 12.06	25 1 34.5	11.3	10.9	0.80
9	2 21.6	15 35 54.24	20 53 36.1	8.0	7.7	0.55	24	3 10.2	19 25 57.41	24 51 39.7	11.4	11.0	0.81
10	2 22.5	15 40 46.82	21 13 7.7	8.0	7.8	0.55	25	3 10.9	19 30 40.89	24 41 8.4	11.5	11.1	0.82
11	2 23.5	15 45 40.42	-21 32 7.5	8.1	7.8	0.56	26	3 11.6	19 35 22.45	-24 30 1.1	11.6	11.2	0.82
12	2 24.4	15 50 35.01	21 50 34.8	8.1	7.9	0.56	27	3 12.3	19 40 2.03	24 18 18.4	11.7	11.3	0.83
13	2 25.4	15 55 30.57	22 8 28.9	8.2	7.9	0.57	28	3 13.0	19 44 39.54	24 6 1.1	11.8	11.4	0.84
14	2 26.4	16 0 27.07	22 25 49.2	8.2	8.0	0.57	29	3 13.7	19 49 14.93	23 53 9.8	11.9	11.5	0.84
15	2 27.4	16 5 24.47	22 42 35.1	8.3	8.0	0.58	30	3 14.3	19 53 48.15	23 39 45.2	12.1	11.7	0.85
16	2 28.4	16 10 22.75	-22 58 45.9	8.4	8.1	0.58	Dec. 1	3 14.9	19 58 19.13	-23 25 48.0	12.2	11.8	0.86
17	2 29.5	16 15 21.89	23 14 21.1	8.4	8.1	0.59	2	3 15.4	20 2 47.81	23 11 18.9	12.3	11.9	0.86
18	2 30.5	16 20 21.84	23 29 20.1	8.5	8.2	0.59	3	3 15.9	20 7 14.14	22 56 18.9	12.4	12.0	0.87
19	2 31.6	16 25 22.57	23 43 42.3	8.5	8.2	0.60	4	3 16.4	20 11 38.03	22 40 48.6	12.6	12.1	0.88
20	2 32.7	16 30 24.04	23 57 27.1	8.6	8.3	0.60	5	3 16.8	20 15 59.43	22 24 49.0	12.7	12.3	0.89
21	2 33.8	16 35 26.18	-24 10 34.1	8.6	8.4	0.61	6	3 17.2	20 20 18.28	-22 8 20.7	12.8	12.4	0.90
22	2 34.9	16 40 28.96	24 23 2.8	8.7	8.4	0.61	7	3 17.5	20 24 34.52	21 51 24.7	13.0	12.6	0.90
23	2 36.0	16 45 32.34	24 34 52.7	8.7	8.5	0.62	8	3 17.7	20 28 48.09	21 34 1.7	13.1	12.7	0.91
24	2 37.1	16 50 36.27	24 46 3.3	8.8	8.5	0.63	9	3 18.0	20 32 58.93	21 16 12.8	13.3	12.8	0.92
25	2 38.2	16 55 40.69	24 56 34.3	8.9	8.6	0.63	10	3 18.2	20 37 6.96	20 57 58.9	13.4	13.0	0.93
26	2 39.3	17 0 45.54	-25 6 25.3	8.9	8.6	0.64	11	3 18.4	20 41 12.12	-20 39 20.9	13.6	13.1	0.94
27	2 40.5	17 5 50.78	25 15 35.9	9.0	8.7	0.64	12	3 18.5	20 45 14.34	20 20 19.6	13.7	13.3	0.95
28	2 41.6	17 10 56.35	25 24 5.8	9.1	8.8	0.65	13	3 18.6	20 49 13.54	20 0 56.1	13.9	13.4	0.96
29	2 42.8	17 16 2.17	25 31 54.6	9.1	8.8	0.65	14	3 18.6	20 53 9.68	19 41 11.3	14.0	13.6	0.96
30	2 43.9	17 21 8.18	25 39 2.1	9.2	8.9	0.66	15	3 18.5	20 57 2.70	19 21 6.3	14.2	13.7	0.97
31	2 45.1	17 26 14.33	-25 45 28.2	9.3	9.0	0.66	16	3 18.4	21 0 52.51	-19 0 41.9	14.4	13.9	0.98
Nov. 1	2 46.2	17 31 20.54	25 51 12.5	9.3	9.0	0.67	17	3 18.2	21 4 39.05	18 39 59.2	14.6	14.1	0.99
2	2 47.4	17 36 26.75	25 56 14.8	9.4	9.1	0.67	18	3 17.9	21 8 22.24	18 18 59.3	14.8	14.3	1.00
3	2 48.5	17 41 32.89	26 0 35.1	9.5	9.2	0.68	19	3 17.6	21 12 2.04	17 57 43.0	15.0	14.5	1.01
4	2 49.7	17 46 38.89	26 4 13.1	9.6	9.3	0.68	20	3 17.3	21 15 38.35	17 36 11.5	15.1	14.6	1.03
5	2 50.8	17 51 44.64	-26 7 9.0	9.7	9.3	0.69	21	3 16.9	21 19 11.12	-17 14 25.7	15.3	14.8	1.04
6	2 52.0	17 56 50.08	26 9 22.6	9.7	9.4	0.70	22	3 16.5	21 22 40.28	16 52 26.8	15.5	15.0	1.05
7	2 53.1	18 1 55.12	26 10 54.0	9.8	9.5	0.70	23	3 16.0	21 26 5.76	16 30 15.9	15.8	15.2	1.06
8	2 54.3	18 6 59.69	26 11 43.1	9.9	9.6	0.71	24	3 15.5	21 29 27.48	16 7 53.9	16.0	15.4	1.07
9	2 55.4	18 12 3.69	26 11 49.9	10.0	9.6	0.71	25	3 14.8	21 32 45.37	15 45 22.0	16.2	15.6	1.09
10	2 56.5	18 17 7.04	-26 11 14.5	10.0	9.7	0.72	26	3 14.1	21 35 59.35	-15 22 41.2	16.4	15.8	1.10
11	2 57.6	18 22 9.65	26 9 57.2	10.1	9.8	0.73	27	3 13.3	21 39 9.35	14 59 52.6	16.6	16.0	1.11
12	2 58.7	18 27 11.43	26 7 58.2	10.2	9.9	0.73	28	3 12.4	21 42 15.26	14 36 57.4	16.8	16.3	1.12
13	2 59.8	18 32 12.30	26 5 17.6	10.3	9.9	0.74	29	3 11.5	21 45 16.99	14 13 56.8	17.1	16.5	1.14
14	3 0.8	18 37 12.17	26 1 55.7	10.4	10.0	0.74	30	3 10.5	21 48 14.47	13 50 51.7	17.3	16.7	1.15
15	3 1.9	18 42 10.95	-25 57 52.6	10.5	10.1	0.75	31	3 9.5	21 51 7.58	-13 27 43.5	17.6	17.0	1.17
16	3 2.9	18 47 8.56	-25 53 8.8	10.6	10.2	0.76	32	3 8.4	21 53 56.22	-13 4 33.7	17.8	17.2	1.18

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	20 3.1	8 48 47.46	+19 2 58.0	4.8	2.7	0.19	Nov. 16	18 41.4	10 28 13.64	+11 40 2.8	6.0	3.4	0.23
2	20 1.6	8 51 12.48	18 54 17.3	4.8	2.8	0.19	17	18 39.4	10 30 5.80	11 30 23.0	6.0	3.4	0.23
3	20 0.1	8 53 36.86	18 45 31.8	4.8	2.8	0.20	18	18 37.3	10 31 57.11	11 20 45.7	6.1	3.5	0.24
4	19 58.5	8 56 0.60	18 36 41.7	4.9	2.8	0.20	19	18 35.2	10 33 47.58	11 11 11.2	6.1	3.5	0.24
5	19 57.0	8 58 23.71	18 27 47.0	4.9	2.8	0.20	20	18 33.1	10 35 37.19	11 1 39.5	6.2	3.5	0.24
6	19 55.4	9 0 46.17	+18 18 47.9	4.9	2.8	0.20	21	18 31.0	10 37 25.94	+10 52 10.9	6.2	3.5	0.24
7	19 53.8	9 3 7.97	18 9 44.8	4.9	2.8	0.20	22	18 28.8	10 39 13.81	10 42 45.5	6.2	3.6	0.24
8	19 52.2	9 5 29.12	18 0 37.7	4.9	2.8	0.20	23	18 26.7	10 41 0.81	10 33 23.5	6.3	3.6	0.24
9	19 50.7	9 7 49.61	17 51 26.7	5.0	2.8	0.20	24	18 24.5	10 42 46.90	10 24 5.1	6.3	3.6	0.24
10	19 49.1	9 10 9.43	17 42 12.0	5.0	2.8	0.20	25	18 22.3	10 44 32.08	10 14 50.5	6.4	3.6	0.25
11	19 47.4	9 12 23.59	+17 32 53.7	5.0	2.9	0.20	26	18 20.1	10 46 16.34	+10 5 39.9	6.4	3.7	0.25
12	19 45.8	9 14 47.09	17 23 32.0	5.0	2.9	0.20	27	18 17.9	10 47 59.64	9 56 33.5	6.4	3.7	0.25
13	19 44.2	9 17 4.92	17 14 7.1	5.0	2.9	0.20	28	18 15.7	10 49 41.99	9 47 31.4	6.5	3.7	0.25
14	19 42.5	9 19 22.07	17 4 39.1	5.1	2.9	0.20	29	18 13.4	10 51 23.38	9 38 34.0	6.5	3.7	0.25
15	19 40.9	9 21 38.54	16 55 8.1	5.1	2.9	0.20	30	18 11.1	10 53 3.77	9 29 41.4	6.6	3.8	0.25
16	19 39.2	9 23 54.35	+16 45 34.3	5.1	2.9	0.20	Dec. 1	18 8.9	10 54 43.14	+9 20 53.8	6.6	3.8	0.26
17	19 37.5	9 26 9.47	16 35 57.8	5.1	2.9	0.20	2	18 6.6	10 56 21.48	9 12 11.4	6.7	3.8	0.26
18	19 35.8	9 28 23.93	16 26 18.8	5.2	2.9	0.20	3	18 4.3	10 57 58.79	9 3 34.4	6.7	3.8	0.26
19	19 34.1	9 30 37.72	16 16 37.4	5.2	3.0	0.21	4	18 1.9	10 59 35.02	8 55 3.0	6.7	3.9	0.26
20	19 32.4	9 32 50.84	16 6 53.8	5.2	3.0	0.21	5	17 59.6	11 1 10.17	8 46 37.4	6.8	3.9	0.26
21	19 30.6	9 35 3.28	+15 57 8.0	5.2	3.0	0.21	6	17 57.2	11 2 44.20	+8 38 18.0	6.8	3.9	0.26
22	19 28.8	9 37 15.04	15 47 20.4	5.3	3.0	0.21	7	17 54.8	11 4 17.12	8 30 4.8	6.9	3.9	0.27
23	19 27.1	9 39 26.11	15 37 31.0	5.3	3.0	0.21	8	17 52.4	11 5 48.90	8 21 58.0	6.9	4.0	0.27
24	19 25.3	9 41 36.50	15 27 39.9	5.3	3.0	0.21	9	17 50.0	11 7 19.51	8 13 57.9	7.0	4.0	0.27
25	19 23.6	9 43 46.22	15 17 47.4	5.3	3.1	0.21	10	17 47.5	11 8 48.94	8 6 4.6	7.0	4.0	0.27
26	19 21.8	9 45 55.25	+15 7 53.6	5.4	3.1	0.21	11	17 45.1	11 10 17.18	+7 58 18.4	7.1	4.1	0.27
27	19 20.0	9 48 3.57	14 57 58.6	5.4	3.1	0.21	12	17 42.6	11 11 44.20	7 50 39.4	7.1	4.1	0.28
28	19 18.2	9 50 11.20	14 48 2.7	5.4	3.1	0.21	13	17 40.1	11 13 10.00	7 43 7.9	7.2	4.1	0.28
29	19 16.4	9 52 18.12	14 38 6.0	5.4	3.1	0.21	14	17 37.6	11 14 34.53	7 35 44.0	7.2	4.1	0.28
30	19 14.6	9 54 24.34	14 28 8.6	5.5	3.1	0.21	15	17 35.0	11 15 57.80	7 28 27.9	7.3	4.2	0.28
31	19 12.7	9 56 29.83	+14 18 10.8	5.5	3.1	0.22	16	17 32.5	11 17 19.77	+7 21 20.0	7.4	4.2	0.28
Nov. 1	19 10.8	9 58 34.59	14 8 12.7	5.5	3.2	0.22	17	17 29.9	11 18 40.43	7 14 20.3	7.4	4.2	0.29
2	19 9.0	10 0 38.61	13 58 14.5	5.5	3.2	0.22	18	17 27.3	11 19 59.75	7 7 29.0	7.5	4.3	0.29
3	19 7.1	10 2 41.89	13 48 16.4	5.6	3.2	0.22	19	17 24.6	11 21 17.71	7 0 46.5	7.5	4.3	0.29
4	19 5.2	10 4 44.43	13 38 18.5	5.6	3.2	0.22	20	17 21.9	11 22 34.28	6 54 12.9	7.6	4.4	0.29
5	19 3.3	10 6 46.21	+13 28 20.9	5.6	3.2	0.22	21	17 19.2	11 23 49.44	+6 47 48.4	7.7	4.4	0.29
6	19 1.4	10 8 47.21	13 18 24.0	5.7	3.2	0.22	22	17 16.5	11 25 3.16	6 41 33.7	7.7	4.4	0.30
7	18 50.4	10 10 47.43	13 8 27.8	5.7	3.3	0.22	23	17 13.8	11 26 15.40	6 35 27.8	7.8	4.5	0.30
8	18 57.4	10 12 46.88	12 58 32.6	5.7	3.3	0.22	24	17 11.1	11 27 26.15	6 29 32.2	7.9	4.5	0.30
9	18 55.5	10 14 45.55	12 48 38.4	5.8	3.3	0.23	25	17 8.3	11 28 35.34	6 23 46.8	7.9	4.5	0.30
10	18 53.6	10 16 43.41	+12 38 45.4	5.8	3.3	0.23	26	17 5.5	11 29 42.96	+6 18 11.8	8.0	4.6	0.31
11	18 51.6	10 18 40.48	12 28 53.9	5.8	3.3	0.23	27	17 2.6	11 30 48.97	6 12 47.5	8.1	4.6	0.31
12	18 49.6	10 20 36.75	12 19 3.9	5.9	3.4	0.23	28	16 59.8	11 31 53.34	6 7 34.1	8.1	4.6	0.31
13	18 47.5	10 22 32.20	12 9 15.6	5.9	3.4	0.23	29	16 56.9	11 32 56.03	6 2 31.9	8.2	4.7	0.31
14	18 45.5	10 24 26.24	11 59 29.2	5.9	3.4	0.23	30	16 54.0	11 33 56.99	5 57 41.2	8.3	4.7	0.31
15	18 43.5	10 26 20.65	+11 49 44.9	6.0	3.4	0.23	31	16 51.0	11 34 56.19	+5 53 2.2	8.3	4.8	0.32
16	18 41.4	10 28 13.64	+11 40 2.8	6.0	3.4	0.23	32	16 48.0	11 35 53.58	+5 48 35.2	8.4	4.8	0.32

## FOR TRANSIT AT WASHINGTON

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi- diam.	S.T. of Sem. Pass. Mer.
	h m s	h m s	° ' "	"	"	s		h m s	h m s	° ' "	"	"	s
Jan. 0	15 46.7	10 31 24.48	+10 28 17.9	1.9	19.8	1.43	Feb. 15	12 29.5	10 15 5.01	+12 11 42.7	2.0	21.4	1.55
1	15 42.6	10 31 16.38	10 29 22.3	1.9	19.9	1.43	16	12 25.1	10 14 35.09	12 14 36.6	2.0	21.4	1.55
2	15 38.6	10 31 7.55	10 30 30.7	1.9	19.9	1.44	17	12 20.7	10 14 5.10	12 17 30.2	2.0	21.4	1.55
3	15 34.5	10 30 58.01	10 31 43.3	1.9	20.0	1.44	18	12 16.3	10 13 35.06	12 20 23.5	2.0	21.4	1.55
4	15 30.4	10 30 47.76	10 32 50.9	1.9	20.0	1.45	19	12 11.8	10 13 5.01	12 23 16.3	2.0	21.4	1.55
5	15 26.2	10 30 36.81	+10 34 20.4	1.9	20.1	1.45	20	12 7.4	10 12 34.96	+12 26 8.4	2.0	21.4	1.56
6	15 22.1	10 30 25.17	10 35 44.9	1.9	20.1	1.45	21	12 3.0	10 12 4.95	12 28 59.8	2.0	21.4	1.56
7	15 18.0	10 30 12.83	10 37 13.4	1.9	20.2	1.46	22	11 58.6	10 11 34.98	12 31 50.3	2.0	21.4	1.56
8	15 13.8	10 29 59.78	10 38 45.7	1.9	20.2	1.46	23	11 54.2	10 11 5.09	12 34 39.9	2.0	21.4	1.55
9	15 9.6	10 29 46.06	10 40 21.9	1.9	20.3	1.46	24	11 49.7	10 10 35.29	12 37 28.3	2.0	21.4	1.55
10	15 5.5	10 29 31.67	+10 42 1.7	1.9	20.3	1.47	25	11 45.3	10 10 5.62	+12 40 15.4	2.0	21.4	1.55
11	15 1.3	10 29 16.60	10 43 45.3	1.9	20.4	1.47	26	11 40.9	10 9 36.07	12 43 1.3	2.0	21.4	1.55
12	14 57.1	10 29 0.87	10 45 32.6	1.9	20.4	1.47	27	11 36.4	10 9 6.68	12 45 45.7	2.0	21.3	1.55
13	14 52.9	10 28 44.47	10 47 23.5	1.9	20.5	1.48	28	11 32.0	10 8 37.45	12 48 28.6	2.0	21.3	1.55
14	14 48.7	10 28 27.44	10 49 17.9	1.9	20.5	1.48	Mar. 1	11 27.6	10 8 8.43	12 51 9.8	2.0	21.3	1.55
15	14 44.5	10 28 9.77	+10 51 15.7	1.9	20.6	1.48	2	11 23.2	10 7 39.62	+12 53 49.3	2.0	21.3	1.55
16	14 40.3	10 27 51.48	10 53 16.9	1.9	20.6	1.49	3	11 18.8	10 7 11.05	12 56 26.9	2.0	21.3	1.55
17	14 36.1	10 27 32.58	10 55 21.3	1.9	20.6	1.49	4	11 14.4	10 6 42.73	12 59 2.5	2.0	21.3	1.55
18	14 31.8	10 27 13.09	10 57 28.9	1.9	20.7	1.50	5	11 10.0	10 6 14.68	13 1 36.2	2.0	21.3	1.55
19	14 27.5	10 26 53.01	10 59 39.5	1.9	20.7	1.50	6	11 5.6	10 5 46.93	13 4 7.6	2.0	21.2	1.55
20	14 23.2	10 26 32.35	+11 1 53.2	1.9	20.8	1.50	7	11 1.2	10 5 19.49	+13 6 36.9	2.0	21.2	1.55
21	14 18.9	10 26 11.12	11 4 9.8	1.9	20.8	1.50	8	10 56.8	10 4 52.37	13 9 3.8	2.0	21.2	1.54
22	14 14.6	10 25 49.36	11 6 29.2	2.0	20.8	1.51	9	10 52.4	10 4 25.60	13 11 28.3	2.0	21.1	1.54
23	14 10.3	10 25 27.06	11 8 51.4	2.0	20.9	1.51	10	10 48.0	10 3 59.20	13 13 50.3	2.0	21.1	1.54
24	14 6.0	10 25 4.25	11 11 16.2	2.0	20.9	1.51	11	10 43.7	10 3 33.20	13 16 9.6	2.0	21.1	1.54
25	14 1.7	10 24 40.94	+11 13 43.5	2.0	21.0	1.52	12	10 39.3	10 3 7.59	+13 18 26.2	2.0	21.1	1.54
26	13 57.4	10 24 17.14	11 16 13.2	2.0	21.0	1.52	13	10 35.0	10 2 42.41	13 20 40.0	2.0	21.0	1.53
27	13 53.0	10 23 52.87	11 18 45.1	2.0	21.0	1.52	14	10 30.7	10 2 17.67	13 22 51.0	2.0	21.0	1.53
28	13 48.7	10 23 28.14	11 21 19.3	2.0	21.1	1.52	15	10 26.4	10 1 53.38	13 24 59.0	2.0	20.9	1.53
29	13 44.4	10 23 2.97	11 23 55.6	2.0	21.1	1.53	16	10 22.0	10 1 29.57	13 27 4.0	2.0	20.9	1.53
30	13 40.0	10 22 37.38	+11 26 33.9	2.0	21.1	1.53	17	10 17.7	10 1 6.26	+13 29 5.9	2.0	20.9	1.52
31	13 35.7	10 22 11.38	11 29 14.1	2.0	21.2	1.53	18	10 13.4	10 0 43.45	13 31 4.6	2.0	20.8	1.52
Feb. 1	13 31.3	10 21 45.00	11 31 56.0	2.0	21.2	1.53	19	10 9.1	10 0 21.18	13 33 0.3	2.0	20.8	1.52
2	13 26.9	10 21 18.24	11 34 39.7	2.0	21.2	1.54	20	10 4.8	9 59 59.43	13 34 52.5	2.0	20.8	1.52
3	13 22.5	10 20 51.12	11 37 24.8	2.0	21.2	1.54	21	10 0.5	9 59 38.23	13 36 41.4	2.0	20.8	1.51
4	13 18.1	10 20 23.67	+11 40 11.4	2.0	21.2	1.54	22	9 56.2	9 59 17.59	+13 38 27.0	1.9	20.7	1.51
5	13 13.7	10 19 55.89	11 42 50.3	2.0	21.3	1.54	23	9 52.0	9 58 57.52	13 40 9.2	1.9	20.7	1.51
6	13 9.3	10 19 27.81	11 45 48.4	2.0	21.3	1.54	24	9 47.7	9 58 38.04	13 41 47.8	1.9	20.6	1.51
7	13 4.9	10 18 59.45	11 48 38.5	2.0	21.3	1.54	25	9 43.5	9 58 19.16	13 43 23.1	1.9	20.6	1.50
8	13 0.5	10 18 30.84	11 51 29.6	2.0	21.3	1.55	26	9 39.2	9 58 0.87	13 44 54.8	1.9	20.5	1.50
9	12 56.1	10 18 1.99	+11 54 21.4	2.0	21.3	1.55	27	9 35.0	9 57 43.20	+13 46 22.9	1.9	20.5	1.50
10	12 51.6	10 17 32.91	11 57 14.1	2.0	21.3	1.55	28	9 30.8	9 57 26.16	13 47 47.4	1.9	20.4	1.49
11	12 47.2	10 17 3.64	12 0 7.3	2.0	21.4	1.55	29	9 26.6	9 57 9.74	13 49 8.2	1.9	20.4	1.49
12	12 42.8	10 16 34.19	12 3 0.9	2.0	21.4	1.55	30	9 22.5	9 56 53.96	13 50 25.4	1.9	20.3	1.49
13	12 38.4	10 16 4.59	12 5 54.7	2.0	21.4	1.55	31	9 18.3	9 56 38.84	13 51 38.9	1.9	20.3	1.48
14	12 34.0	10 15 34.85	+12 8 48.8	2.0	21.4	1.55	32	9 14.1	9 56 24.36	+13 52 48.6	1.9	20.2	1.48
15	12 29.5	10 15 5.01	+12 11 42.7	2.0	21.4	1.55	33	9 9.9	9 56 10.55	+13 53 54.7	1.9	20.2	1.48

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	9 14.1	9 56 24.36	+13 52 48.6	1.9	20.2	1.48	May 17	6 14.6	9 57 51.49	+13 38 14.2	1.7	17.7	1.30
2	9 9.9	9 56 10.55	13 53 54.7	1.9	20.2	1.48	18	6 11.0	9 58 9.18	13 36 30.9	1.7	17.7	1.29
3	9 5.7	9 55 57.41	13 54 57.1	1.9	20.1	1.47	19	6 7.3	9 58 27.48	13 34 44.2	1.7	17.6	1.29
4	9 1.6	9 55 44.92	13 55 55.6	1.9	20.1	1.47	20	6 3.7	9 58 46.38	13 32 54.3	1.7	17.6	1.28
5	8 57.5	9 55 33.13	13 56 50.3	1.9	20.0	1.47	21	6 0.1	9 59 5.86	13 31 1.0	1.6	17.5	1.28
6	8 53.4	9 55 22.02	+13 57 41.3	1.9	20.0	1.46	22	5 56.5	9 59 25.92	+13 29 5.0	1.6	17.5	1.28
7	8 49.3	9 55 11.60	13 58 28.3	1.9	19.9	1.46	23	5 52.9	9 59 46.56	13 27 5.7	1.6	17.4	1.27
8	8 45.2	9 55 1.86	13 59 11.6	1.9	19.9	1.46	24	5 49.4	10 0 7.77	13 25 3.3	1.6	17.4	1.27
9	8 41.1	9 54 52.84	13 59 51.0	1.9	19.8	1.45	25	5 45.8	10 0 29.55	13 22 57.8	1.6	17.3	1.25
10	8 37.0	9 54 44.52	14 0 26.6	1.9	19.8	1.45	26	5 42.2	10 0 51.88	13 20 49.3	1.6	17.3	1.26
11	8 32.9	9 54 36.90	+14 0 58.2	1.9	19.7	1.44	27	5 38.7	10 1 14.75	+13 18 37.7	1.6	17.2	1.26
12	8 28.9	9 54 30.01	14 1 26.0	1.8	19.7	1.44	28	5 35.1	10 1 38.16	13 16 23.1	1.6	17.2	1.25
13	8 24.8	9 54 23.83	14 1 49.8	1.8	19.6	1.44	29	5 31.6	10 2 2.10	13 14 5.4	1.6	17.1	1.25
14	8 20.8	9 54 18.35	14 2 9.9	1.8	19.6	1.43	30	5 28.1	10 2 26.58	13 11 45.2	1.6	17.1	1.25
15	8 16.8	9 54 13.60	14 2 26.1	1.8	19.5	1.43	31	5 24.6	10 2 51.58	+13 9 21.7	1.6	17.0	1.24
16	8 12.8	9 54 9.57	+14 2 38.3	1.8	19.4	1.42	Dec. 1	19 24.9	12 10 59.64	+0 6 27.9	1.5	16.4	1.16
17	8 8.8	9 54 6.26	14 2 46.6	1.8	19.4	1.42	2	19 21.5	12 11 29.37	0 3 28.9	1.5	16.4	1.17
18	8 4.8	9 54 3.68	14 2 51.2	1.8	19.3	1.42	3	19 18.1	12 11 58.64	+0 0 33.1	1.5	16.5	1.17
19	8 0.9	9 54 1.82	14 2 51.8	1.8	19.3	1.41	4	19 11.6	12 12 27.42	-0 2 19.5	1.5	16.5	1.17
20	7 57.0	9 54 0.69	14 2 48.7	1.8	19.2	1.41	5	19 11.2	12 12 55.73	0 5 9.0	1.5	16.6	1.18
21	7 53.0	9 54 0.28	+14 2 41.7	1.8	19.2	1.40	6	19 7.7	12 13 23.54	-0 7 55.1	1.5	16.6	1.18
22	7 49.1	9 54 0.57	14 2 30.9	1.8	19.1	1.40	7	19 4.2	12 13 50.87	0 10 37.7	1.6	16.7	1.18
23	7 45.2	9 54 1.59	14 2 16.1	1.8	19.0	1.39	8	19 0.7	12 14 17.69	0 13 16.9	1.6	16.7	1.18
24	7 41.3	9 54 3.31	14 1 57.7	1.8	19.0	1.39	9	18 57.2	12 14 44.00	0 15 52.8	1.6	16.8	1.18
25	7 37.4	9 54 5.75	14 1 35.5	1.8	18.9	1.39	10	18 53.7	12 15 9.81	0 18 25.1	1.6	16.8	1.19
26	7 33.5	9 54 8.88	+14 1 9.6	1.8	18.9	1.38	11	18 50.2	12 15 35.09	-0 20 53.8	1.6	16.8	1.19
27	7 29.6	9 54 12.73	14 0 40.0	1.8	18.8	1.38	12	18 46.6	12 15 59.85	0 23 19.0	1.6	16.9	1.20
28	7 25.8	9 54 17.27	14 0 6.7	1.8	18.8	1.37	13	18 43.1	12 16 24.07	0 25 40.6	1.6	16.9	1.20
29	7 21.9	9 54 22.51	13 59 29.7	1.8	18.7	1.37	14	18 39.6	12 16 47.75	0 27 58.7	1.6	17.0	1.20
30	7 18.1	9 54 28.44	13 58 49.1	1.8	18.7	1.37	15	18 36.0	12 17 10.89	0 30 13.0	1.6	17.0	1.21
May 1	7 14.3	9 54 35.06	+13 58 4.8	1.8	18.6	1.36	16	18 32.5	12 17 33.47	-0 32 23.6	1.6	17.1	1.21
2	7 10.5	9 54 42.36	13 57 16.8	1.7	18.5	1.36	17	18 28.9	12 17 55.50	0 34 30.5	1.6	17.1	1.21
3	7 6.7	9 54 50.34	13 56 25.3	1.7	18.5	1.35	18	18 25.4	12 18 16.98	0 36 33.5	1.6	17.2	1.22
4	7 2.9	9 54 59.00	13 55 30.0	1.7	18.4	1.35	19	18 21.8	12 18 37.89	0 38 32.8	1.6	17.2	1.22
5	6 59.1	9 55 8.34	13 54 31.3	1.7	18.4	1.34	20	18 18.2	12 18 58.22	0 40 28.2	1.6	17.3	1.23
6	6 55.3	9 55 18.34	+13 53 29.0	1.7	18.3	1.34	21	18 14.6	12 19 17.99	-0 42 19.7	1.6	17.3	1.23
7	6 51.5	9 55 29.02	13 52 23.0	1.7	18.3	1.34	22	18 11.0	12 19 37.16	0 44 7.4	1.6	17.4	1.23
8	6 47.8	9 55 40.37	13 51 13.7	1.7	18.2	1.33	23	18 7.3	12 19 55.75	0 45 51.1	1.6	17.4	1.24
9	6 44.0	9 55 52.36	13 50 0.8	1.7	18.2	1.33	24	18 3.7	12 20 13.73	0 47 30.8	1.6	17.5	1.24
10	6 40.3	9 56 5.01	13 48 44.4	1.7	18.1	1.32	25	18 0.0	12 20 31.12	0 49 6.5	1.6	17.5	1.24
11	6 36.6	9 56 18.31	+13 47 24.6	1.7	18.1	1.32	26	17 56.4	12 20 47.90	-0 50 38.1	1.7	17.6	1.25
12	6 32.9	9 56 32.26	13 46 1.3	1.7	18.0	1.32	27	17 52.7	12 21 4.05	0 52 5.6	1.7	17.6	1.25
13	6 29.2	9 56 46.85	13 44 34.5	1.7	17.9	1.31	28	17 49.0	12 21 19.59	0 53 29.0	1.7	17.7	1.26
14	6 25.6	9 57 2.06	13 43 4.6	1.7	17.9	1.31	29	17 45.4	12 21 34.50	0 54 48.3	1.7	17.7	1.26
15	6 21.9	9 57 17.91	13 41 31.1	1.7	17.8	1.30	30	17 41.7	12 21 48.77	0 56 3.3	1.7	17.8	1.26
16	6 18.2	9 57 34.39	+13 39 54.2	1.7	17.8	1.30	31	17 38.0	12 22 2.41	-0 57 14.1	1.7	17.8	1.27
17	6 14.6	9 57 51.49	+13 38 14.2	1.7	17.7	1.30	32	17 34.3	12 22 15.40	-0 58 20.7	1.7	17.9	1.27

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi- diam.	S.T. of Sem. Pass. Mer.
Jan. 0	10 29.6	5 13 25.16	+21 34 41.0	1.1	9.6	0.74	Feb. 15	7 20.6	5 5 16.30	+21 34 9.4	1.0	9.1	0.69
1	10 25.4	5 13 6.46	21 34 29.5	1.1	9.6	0.74	16	7 16.7	5 5 16.05	21 34 22.8	1.0	9.0	0.69
2	10 21.1	5 12 48.00	21 34 18.3	1.1	9.6	0.74	17	7 12.7	5 5 16.26	21 34 36.8	1.0	9.0	0.69
3	10 16.9	5 12 29.78	21 34 7.5	1.1	9.6	0.74	18	7 8.8	5 5 17.00	21 34 51.5	1.0	9.0	0.69
4	10 12.7	5 12 11.82	21 33 57.0	1.1	9.6	0.74	19	7 4.9	5 5 18.20	21 35 6.8	1.0	9.0	0.69
5	10 8.4	5 11 54.14	+21 33 46.8	1.1	9.6	0.74	20	7 1.0	5 5 19.89	+21 35 22.7	1.0	9.0	0.69
6	10 4.2	5 11 36.74	21 33 37.0	1.1	9.6	0.73	21	6 57.1	5 5 22.06	21 35 39.2	1.0	9.0	0.69
7	10 0.0	5 11 19.63	21 33 27.6	1.1	9.6	0.73	22	6 53.2	5 5 24.71	21 35 56.4	1.0	8.9	0.68
8	9 55.8	5 11 2.82	21 33 18.6	1.1	9.6	0.73	23	6 49.3	5 5 27.84	21 36 14.2	1.0	8.9	0.68
9	9 51.6	5 10 46.31	21 33 10.0	1.1	9.6	0.73	24	6 45.5	5 5 31.45	21 36 32.6	1.0	8.9	0.68
10	9 47.4	5 10 30.12	+21 33 1.8	1.1	9.5	0.73	25	6 41.6	5 5 35.54	+21 36 51.6	1.0	8.9	0.68
11	9 43.2	5 10 14.26	21 32 54.0	1.1	9.5	0.73	26	6 37.7	5 5 40.11	21 37 11.2	1.0	8.9	0.68
12	9 39.0	5 9 58.74	21 32 46.7	1.1	9.5	0.73	27	6 33.9	5 5 45.15	21 37 31.3	1.0	8.9	0.68
13	9 34.8	5 9 43.56	21 32 39.8	1.1	9.5	0.73	28	6 30.1	5 5 50.66	21 37 52.0	1.0	8.8	0.68
14	9 30.7	5 9 28.75	21 32 33.4	1.1	9.5	0.73	Mar. 1	6 26.2	5 5 56.64	21 38 13.3	1.0	8.8	0.68
15	9 26.5	5 9 14.20	+21 32 27.4	1.1	9.5	0.73	2	6 22.4	5 6 3.09	+21 38 35.2	1.0	8.8	0.67
16	9 22.3	5 9 0.19	21 32 22.0	1.1	9.5	0.73	3	6 18.6	5 6 10.01	21 38 57.6	1.0	8.8	0.67
17	9 18.1	5 8 46.48	21 32 17.0	1.1	9.5	0.73	4	6 14.8	5 6 17.39	21 39 20.6	1.0	8.8	0.67
18	9 14.0	5 8 33.15	21 32 12.5	1.1	9.5	0.72	5	6 11.0	5 6 25.24	21 39 44.1	1.0	8.7	0.67
19	9 9.8	5 8 20.21	21 32 8.6	1.1	9.4	0.72	6	6 7.2	5 6 33.54	21 40 8.2	1.0	8.7	0.67
20	9 5.7	5 8 7.68	+21 32 5.3	1.1	9.4	0.72	7	6 3.4	5 6 42.30	+21 40 32.7	1.0	8.7	0.67
21	9 1.5	5 7 55.55	21 32 2.5	1.1	9.4	0.72	8	5 59.6	5 6 51.52	21 40 57.7	1.0	8.7	0.67
22	8 57.4	5 7 43.83	21 32 0.2	1.1	9.4	0.72	9	5 55.8	5 7 1.19	21 41 23.2	1.0	8.7	0.67
23	8 53.3	5 7 32.52	21 31 58.5	1.1	9.4	0.72	10	5 52.1	5 7 11.32	21 41 49.2	1.0	8.7	0.66
24	8 49.2	5 7 21.63	21 31 57.4	1.1	9.4	0.72	11	5 48.4	5 7 21.89	21 42 15.7	1.0	8.6	0.66
25	8 45.1	5 7 11.17	+21 31 56.9	1.1	9.4	0.72	12	5 44.6	5 7 32.91	+21 42 42.7	1.0	8.6	0.66
26	8 41.0	5 7 1.14	21 31 56.9	1.1	9.4	0.72	13	5 40.8	5 7 44.37	21 43 10.1	1.0	8.6	0.66
27	8 36.9	5 6 51.55	21 31 57.6	1.1	9.3	0.72	14	5 37.1	5 7 56.28	21 43 37.9	1.0	8.6	0.66
28	8 32.8	5 6 42.40	21 31 58.8	1.1	9.3	0.71	15	5 33.4	5 8 8.63	+21 44 6.2	1.0	8.6	0.66
29	8 28.7	5 6 33.69	21 32 0.7	1.1	9.3	0.71							
30	8 24.7	5 6 25.43	+21 32 3.2	1.1	9.3	0.71	Sept. 15	18 49.4	6 31 48.42	+22 21 7.5	1.0	8.5	0.65
31	8 20.6	5 6 17.61	21 32 6.3	1.1	9.3	0.71	16	18 45.7	6 32 3.68	22 20 55.5	1.0	8.5	0.65
Feb. 1	8 16.5	5 6 10.24	21 32 10.0	1.0	9.3	0.71	17	18 42.0	6 32 18.53	22 20 43.7	1.0	8.5	0.65
2	8 12.5	5 6 3.34	21 32 14.4	1.0	9.3	0.71	18	18 38.4	6 32 32.97	22 20 32.0	1.0	8.5	0.65
3	8 8.5	5 5 56.89	21 32 19.4	1.0	9.2	0.71	19	18 34.7	6 32 47.00	22 20 20.6	1.0	8.5	0.65
4	8 4.4	5 5 50.89	+21 32 25.1	1.0	9.2	0.71	20	18 31.0	6 33 0.61	+22 20 9.5	1.0	8.6	0.66
5	8 0.4	5 5 45.37	21 32 31.4	1.0	9.2	0.70	21	18 27.2	6 33 13.80	22 19 58.6	1.0	8.6	0.66
6	7 56.4	5 5 40.31	21 32 38.3	1.0	9.2	0.70	22	18 23.5	6 33 26.57	22 19 47.9	1.0	8.6	0.66
7	7 52.4	5 5 35.73	21 32 45.8	1.0	9.2	0.70	23	18 19.8	6 33 38.91	22 19 37.5	1.0	8.6	0.66
8	7 48.4	5 5 31.61	21 32 54.0	1.0	9.2	0.70	24	18 16.1	6 33 50.82	22 19 27.4	1.0	8.6	0.66
9	7 44.4	5 5 27.98	+21 33 2.8	1.0	9.2	0.70	25	18 12.3	6 34 2.30	+22 19 17.5	1.0	8.6	0.66
10	7 40.4	5 5 24.83	21 33 12.3	1.0	9.1	0.70	26	18 8.6	6 34 13.34	22 19 8.0	1.0	8.7	0.67
11	7 36.4	5 5 22.16	21 33 22.4	1.0	9.1	0.70	27	18 4.8	6 34 23.94	22 18 58.8	1.0	8.7	0.67
12	7 32.4	5 5 19.97	21 33 33.2	1.0	9.1	0.70	28	18 1.1	6 34 34.10	22 18 49.9	1.0	8.7	0.67
13	7 28.4	5 5 18.26	21 33 44.6	1.0	9.1	0.69	29	17 57.3	6 34 43.82	22 18 41.3	1.0	8.7	0.67
14	7 24.5	5 5 17.04	+21 33 56.7	1.0	9.1	0.69	30	17 53.5	6 34 53.08	+22 18 33.1	1.0	8.7	0.67
15	7 20.6	5 5 16.30	+21 34 9.4	1.0	9.1	0.69	31	17 49.7	6 35 1.89	+22 18 25.2	1.0	8.7	0.67

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	17 49.7	6 35 1.89	+22 18 25.2	1.0	8.7	0.67	Nov. 16	14 47.1	6 33 18.52	+22 20 0.4	1.1	9.4	0.73
2	17 46.0	6 35 10.25	22 18 17.7	1.0	8.7	0.67	17	14 43.0	6 33 5.65	22 20 12.3	1.1	9.5	0.73
3	17 42.1	6 35 18.14	22 18 10.6	1.0	8.7	0.67	18	14 38.8	6 32 52.40	22 20 24.6	1.1	9.5	0.73
4	17 38.3	6 35 25.57	22 18 3.8	1.0	8.8	0.68	19	14 34.7	6 32 38.75	22 20 37.2	1.1	9.5	0.73
5	17 34.5	6 35 32.54	22 17 57.4	1.0	8.8	0.68	20	14 30.5	6 32 24.72	22 20 50.2	1.1	9.5	0.73
6	17 30.7	6 35 39.04	+22 17 51.4	1.0	8.8	0.68	21	14 26.3	6 32 10.33	+22 21 3.4	1.1	9.5	0.73
7	17 26.9	6 35 45.07	22 17 45.8	1.0	8.8	0.68	22	14 22.2	6 31 55.58	22 21 17.0	1.1	9.5	0.73
8	17 23.0	6 35 50.62	22 17 40.6	1.0	8.8	0.68	23	14 18.0	6 31 40.46	22 21 30.9	1.1	9.5	0.73
9	17 19.2	6 35 55.70	22 17 35.9	1.0	8.8	0.68	24	14 13.8	6 31 24.99	22 21 45.0	1.1	9.5	0.73
10	17 15.3	6 36 0.31	22 17 31.5	1.0	8.9	0.68	25	14 9.6	6 31 9.19	22 21 59.4	1.1	9.5	0.74
11	17 11.5	6 36 4.44	+22 17 27.5	1.0	8.9	0.68	26	14 5.4	6 30 53.05	+22 22 14.1	1.1	9.6	0.74
12	17 7.6	6 36 8.10	22 17 23.9	1.0	8.9	0.69	27	14 1.2	6 30 36.58	22 22 29.0	1.1	9.6	0.74
13	17 3.7	6 36 11.27	22 17 20.8	1.0	8.9	0.69	28	13 57.0	6 30 19.79	22 22 44.2	1.1	9.6	0.74
14	16 59.8	6 36 13.97	22 17 18.1	1.0	8.9	0.69	29	13 52.8	6 30 2.70	22 22 59.6	1.1	9.6	0.74
15	16 55.9	6 36 16.19	22 17 15.9	1.0	8.9	0.69	30	13 48.6	6 29 45.30	22 23 15.1	1.1	9.6	0.74
16	16 52.0	6 36 17.93	+22 17 14.1	1.0	9.0	0.69	Dec. 1	13 44.4	6 29 27.61	+22 23 31.0	1.1	9.6	0.74
17	16 48.1	6 36 19.19	22 17 12.7	1.0	9.0	0.69	2	13 40.1	6 29 9.63	22 23 46.9	1.1	9.6	0.74
18	16 44.2	6 36 19.97	22 17 11.8	1.0	9.0	0.69	3	13 35.9	6 28 51.39	22 24 3.0	1.1	9.6	0.74
19	16 40.2	6 36 20.28	22 17 11.3	1.0	9.0	0.69	4	13 31.7	6 28 32.89	22 24 19.3	1.1	9.7	0.74
20	16 36.3	6 36 20.10	22 17 11.3	1.0	9.0	0.70	5	13 27.4	6 28 14.13	22 24 35.8	1.1	9.7	0.74
21	16 32.4	6 36 19.45	+22 17 11.8	1.0	9.0	0.70	6	13 23.2	6 27 55.12	+22 24 52.4	1.1	9.7	0.74
22	16 28.4	6 36 18.31	22 17 12.7	1.0	9.1	0.70	7	13 18.9	6 27 35.90	22 25 9.2	1.1	9.7	0.74
23	16 24.5	6 36 16.70	22 17 14.1	1.0	9.1	0.70	8	13 14.7	6 27 16.46	22 25 26.0	1.1	9.7	0.75
24	16 20.5	6 36 14.61	22 17 15.9	1.0	9.1	0.70	9	13 10.4	6 26 56.80	22 25 43.0	1.1	9.7	0.75
25	16 16.5	6 36 12.05	22 17 18.2	1.0	9.1	0.70	10	13 6.1	6 26 36.95	22 26 0.1	1.1	9.7	0.75
26	16 12.6	6 36 9.01	+22 17 20.9	1.0	9.1	0.70	11	13 1.9	6 26 16.92	+22 26 17.2	1.1	9.7	0.75
27	16 8.6	6 36 5.49	22 17 24.1	1.0	9.1	0.70	12	12 57.6	6 25 56.72	22 26 34.4	1.1	9.7	0.75
28	16 4.6	6 36 1.50	22 17 27.8	1.0	9.2	0.71	13	12 53.3	6 25 36.35	22 26 51.6	1.1	9.7	0.75
29	16 0.6	6 35 57.03	22 17 32.0	1.0	9.2	0.71	14	12 49.1	6 25 15.83	22 27 8.9	1.1	9.7	0.75
30	15 56.6	6 35 52.09	22 17 36.6	1.0	9.2	0.71	15	12 44.8	6 24 55.19	22 27 26.2	1.1	9.7	0.75
31	15 52.6	6 35 46.68	+22 17 41.6	1.0	9.2	0.71	16	12 40.5	6 24 34.42	+22 27 43.6	1.1	9.7	0.75
Nov. 1	15 48.5	6 35 40.80	22 17 47.1	1.0	9.2	0.71	17	12 36.2	6 24 13.53	22 28 1.0	1.1	9.7	0.75
2	15 44.5	6 35 34.45	22 17 53.1	1.0	9.2	0.71	18	12 31.9	6 23 52.54	22 28 18.4	1.1	9.7	0.75
3	15 40.4	6 35 27.64	22 17 59.5	1.0	9.3	0.71	19	12 27.6	6 23 31.47	22 28 35.8	1.1	9.7	0.75
4	15 36.4	6 35 20.36	22 18 6.3	1.0	9.3	0.71	20	12 23.4	6 23 10.33	22 28 53.2	1.1	9.7	0.75
5	15 32.3	6 35 12.63	+22 18 13.6	1.1	9.3	0.72	21	12 19.1	6 22 49.11	+22 29 10.6	1.1	9.7	0.75
6	15 28.3	6 35 4.44	22 18 21.3	1.1	9.3	0.72	22	12 14.8	6 22 27.83	22 29 28.0	1.1	9.7	0.75
7	15 24.2	6 34 55.80	22 18 29.4	1.1	9.3	0.72	23	12 10.5	6 22 6.52	22 29 45.3	1.1	9.7	0.75
8	15 20.1	6 34 46.71	22 18 37.9	1.1	9.3	0.72	24	12 6.2	6 21 45.19	22 30 2.6	1.1	9.7	0.75
9	15 16.0	6 34 37.18	22 18 46.9	1.1	9.3	0.72	25	12 1.9	6 21 23.82	22 30 19.8	1.1	9.7	0.75
10	15 11.9	6 34 27.22	+22 18 56.2	1.1	9.4	0.72	26	11 57.6	6 21 2.44	+22 30 37.0	1.1	9.7	0.75
11	15 7.8	6 34 16.82	22 19 6.0	1.1	9.4	0.72	27	11 53.3	6 20 41.08	22 30 54.1	1.1	9.7	0.75
12	15 3.7	6 34 5.99	22 19 16.1	1.1	9.4	0.72	28	11 49.0	6 20 19.73	22 31 11.2	1.1	9.7	0.75
13	14 59.5	6 33 54.74	22 19 26.6	1.1	9.4	0.72	29	11 44.8	6 19 58.41	22 31 28.2	1.1	9.7	0.75
14	14 55.4	6 33 43.08	22 19 37.5	1.1	9.4	0.73	30	11 40.5	6 19 37.12	22 31 45.1	1.1	9.7	0.75
15	14 51.3	6 33 31.00	+22 19 48.8	1.1	9.4	0.73	31	11 36.2	6 19 15.90	+22 32 1.9	1.1	9.7	0.75
16	14 47.1	6 33 18.52	+22 20 0.4	1.1	9.4	0.73	32	11 31.9	6 18 54.74	+22 32 18.5	1.1	9.7	0.75

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	17 26.9	12 11 54.75	- 0 28 33.2	0.5	1.8	0.12	Feb. 15	14 23.5	12 9 22.44	- 0 10 22.3	0.5	1.9	0.13
1	17 23.0	12 11 55.84	0 28 37.7	0.5	1.8	0.12	16	14 19.5	12 9 15.13	0 9 33.3	0.5	1.9	0.13
2	17 19.1	12 11 56.72	0 28 40.8	0.5	1.9	0.12	17	14 15.4	12 9 7.70	0 8 43.5	0.5	1.9	0.13
3	17 15.2	12 11 57.40	0 28 42.6	0.5	1.9	0.12	18	14 11.4	12 9 0.14	0 7 52.9	0.5	1.9	0.13
4	17 11.3	12 11 57.86	0 28 43.1	0.5	1.9	0.12	19	14 7.3	12 8 52.46	0 7 1.7	0.5	1.9	0.13
5	17 7.3	12 11 58.12	- 0 28 42.3	0.5	1.9	0.12	20	14 3.3	12 8 44.66	- 0 6 9.7	0.5	1.9	0.13
6	17 3.4	12 11 58.18	0 28 40.1	0.5	1.9	0.12	21	13 59.2	12 8 36.75	0 5 17.0	0.5	1.9	0.13
7	16 59.5	12 11 58.02	0 28 36.5	0.5	1.9	0.12	22	13 55.1	12 8 28.73	0 4 23.6	0.5	1.9	0.13
8	16 55.5	12 11 57.66	0 28 31.7	0.5	1.9	0.12	23	13 51.1	12 8 20.60	0 3 29.6	0.5	1.9	0.13
9	16 51.6	12 11 57.09	0 28 25.5	0.5	1.9	0.12	24	13 47.0	12 8 12.37	0 2 34.9	0.5	1.9	0.13
10	16 47.6	12 11 56.32	- 0 28 17.9	0.5	1.9	0.12	25	13 42.9	12 8 4.03	- 0 1 39.7	0.5	1.9	0.13
11	16 43.7	12 11 55.35	0 28 9.1	0.5	1.9	0.12	26	13 38.9	12 7 55.60	- 0 0 43.9	0.5	1.9	0.13
12	16 39.7	12 11 54.17	0 27 58.9	0.5	1.9	0.12	27	13 34.8	12 7 47.09	+ 0 0 12.5	0.5	1.9	0.13
13	16 35.8	12 11 52.78	0 27 47.4	0.5	1.9	0.12	28	13 30.7	12 7 38.48	0 1 9.4	0.5	1.9	0.13
14	16 31.8	12 11 51.19	0 27 34.7	0.5	1.9	0.12	Mar. 1	13 26.6	12 7 29.78	0 2 6.9	0.5	1.9	0.13
15	16 27.9	12 11 49.40	- 0 27 20.6	0.5	1.9	0.12	2	13 22.6	12 7 21.01	+ 0 3 4.8	0.5	1.9	0.13
16	16 23.9	12 11 47.40	0 27 5.2	0.5	1.9	0.12	3	13 18.5	12 7 12.16	0 4 3.1	0.5	1.9	0.13
17	16 19.9	12 11 45.20	0 26 48.5	0.5	1.9	0.13	4	13 14.4	12 7 3.23	0 5 1.9	0.5	1.9	0.13
18	16 16.0	12 11 42.81	0 26 30.6	0.5	1.9	0.13	5	13 10.3	12 6 54.24	0 6 1.1	0.5	1.9	0.13
19	16 12.0	12 11 40.22	0 26 11.4	0.5	1.9	0.13	6	13 6.2	12 6 45.18	0 7 0.7	0.5	1.9	0.13
20	16 8.0	12 11 37.43	- 0 25 50.9	0.5	1.9	0.13	7	13 2.1	12 6 36.05	+ 0 8 0.6	0.5	1.9	0.13
21	16 4.0	12 11 34.45	0 25 29.2	0.5	1.9	0.13	8	12 58.1	12 6 26.87	0 9 0.9	0.5	1.9	0.13
22	16 0.0	12 11 31.28	0 25 6.3	0.5	1.9	0.13	9	12 54.0	12 6 17.63	0 10 1.4	0.5	1.9	0.13
23	15 56.0	12 11 27.91	0 24 42.1	0.5	1.9	0.13	10	12 49.9	12 6 8.35	0 11 2.2	0.5	1.9	0.13
24	15 52.1	12 11 24.35	0 24 16.7	0.5	1.9	0.13	11	12 45.8	12 5 59.02	0 12 3.3	0.5	1.9	0.13
25	15 48.1	12 11 20.61	- 0 23 50.2	0.5	1.9	0.13	12	12 41.7	12 5 49.65	+ 0 13 4.6	0.5	1.9	0.13
26	15 44.1	12 11 16.68	0 23 22.5	0.5	1.9	0.13	13	12 37.6	12 5 40.23	0 14 6.1	0.5	1.9	0.13
27	15 40.1	12 11 12.57	0 22 53.6	0.5	1.9	0.13	14	12 33.5	12 5 30.79	0 15 7.7	0.5	1.9	0.13
28	15 36.1	12 11 8.28	0 22 23.5	0.5	1.9	0.13	15	12 29.4	12 5 21.32	0 16 9.4	0.5	1.9	0.13
29	15 32.1	12 11 3.81	0 21 52.3	0.5	1.9	0.13	16	12 25.4	12 5 11.83	0 17 11.2	0.5	1.9	0.13
30	15 28.0	12 10 59.16	- 0 21 20.0	0.5	1.9	0.13	17	12 21.3	12 5 2.31	+ 0 18 13.2	0.5	1.9	0.13
31	15 24.0	12 10 54.34	0 20 46.6	0.5	1.9	0.13	18	12 17.2	12 4 52.78	0 19 15.1	0.5	1.9	0.13
Feb. 1	15 20.0	12 10 49.34	0 20 12.1	0.5	1.9	0.13	19	12 13.1	12 4 43.24	0 20 17.1	0.5	1.9	0.13
2	15 16.0	12 10 44.17	0 19 36.5	0.5	1.9	0.13	20	12 9.0	12 4 33.70	0 21 19.0	0.5	1.9	0.13
3	15 12.0	12 10 38.83	0 18 59.8	0.5	1.9	0.13	21	12 4.9	12 4 24.15	0 22 21.0	0.5	1.9	0.13
4	15 8.0	12 10 33.32	- 0 18 22.0	0.5	1.9	0.13	22	12 0.8	12 4 14.60	+ 0 23 22.9	0.5	1.9	0.13
5	15 3.9	12 10 27.64	0 17 43.2	0.5	1.9	0.13	23	11 56.7	12 4 5.07	0 24 24.6	0.5	1.9	0.13
6	14 59.8	12 10 21.81	0 17 3.4	0.5	1.9	0.13	24	11 52.6	12 3 55.55	0 25 26.3	0.5	1.9	0.13
7	14 55.9	12 10 15.82	0 16 22.6	0.5	1.9	0.13	25	11 48.5	12 3 46.04	0 26 27.8	0.5	1.9	0.13
8	14 51.9	12 10 9.67	0 15 40.8	0.5	1.9	0.13	26	11 44.5	12 3 36.55	0 27 29.1	0.5	1.9	0.13
9	14 47.8	12 10 3.36	- 0 14 58.1	0.5	1.9	0.13	27	11 40.4	12 3 27.08	+ 0 28 30.2	0.5	1.9	0.13
10	14 43.8	12 9 56.90	0 14 14.4	0.5	1.9	0.13	28	11 36.3	12 3 17.64	0 29 31.0	0.5	1.9	0.13
11	14 39.7	12 9 50.30	0 13 29.7	0.5	1.9	0.13	29	11 32.2	12 3 8.23	0 30 31.6	0.5	1.9	0.13
12	14 35.7	12 9 43.55	0 12 44.2	0.5	1.9	0.13	30	11 28.1	12 2 58.86	0 31 31.9	0.5	1.9	0.13
13	14 31.6	12 9 36.65	0 11 57.8	0.5	1.9	0.13	31	11 24.0	12 2 49.53	0 32 32.0	0.5	1.9	0.13
14	14 27.6	12 9 29.61	- 0 11 10.5	0.5	1.9	0.13	32	11 19.9	12 2 40.24	+ 0 33 31.7	0.5	1.9	0.13
15	14 23.5	12 9 22.44	- 0 10 22.3	0.5	1.9	0.13	33	11 15.9	12 2 30.99	+ 0 34 31.0	0.5	1.9	0.13



## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	11 19.9	12 240.24	+ 0 33 31.7	0.5	1.9	0.13	May 17	8 13.8	11 57 20.65	+ 1 6 48.1	0.5	1.9	0.13
2	11 15.9	12 230.99	0 34 31.0	0.5	1.9	0.13	18	8 9.8	11 57 17.14	1 7 8.3	0.5	1.9	0.13
3	11 11.8	12 221.80	0 35 30.0	0.5	1.9	0.13	19	8 5.8	11 57 13.81	1 7 27.4	0.5	1.9	0.13
4	11 7.7	12 212.66	0 36 28.5	0.5	1.9	0.13	20	8 1.8	11 57 10.66	1 7 45.2	0.5	1.9	0.13
5	11 3.6	12 2 3.58	0 37 26.6	0.5	1.9	0.13	21	7 57.8	11 57 7.69	1 8 1.9	0.5	1.9	0.13
6	10 59.5	12 1 54.56	+ 0 38 24.3	0.5	1.9	0.13	22	7 53.9	11 57 4.91	+ 1 8 17.3	0.5	1.9	0.13
7	10 55.4	12 1 45.60	0 39 21.5	0.5	1.9	0.13	23	7 49.9	11 57 2.32	1 8 31.5	0.5	1.9	0.13
8	10 51.4	12 1 36.72	0 40 18.2	0.5	1.9	0.13	24	7 45.9	11 56 59.91	1 8 44.5	0.5	1.9	0.13
9	10 47.3	12 1 27.91	0 41 14.3	0.5	1.9	0.13	25	7 41.9	11 56 57.68	1 8 56.3	0.5	1.9	0.13
10	10 43.2	12 1 19.17	0 42 9.9	0.5	1.9	0.13	26	7 38.0	11 56 55.65	1 9 6.7	0.5	1.9	0.13
11	10 39.1	12 1 10.52	+ 0 43 5.0	0.5	1.9	0.13	27	7 34.0	11 56 53.80	+ 1 9 16.0	0.5	1.9	0.12
12	10 35.1	12 1 1.96	0 43 59.4	0.5	1.9	0.13	28	7 30.0	11 56 52.14	1 9 24.1	0.5	1.9	0.12
13	10 31.0	12 0 53.48	0 44 53.1	0.5	1.9	0.13	29	7 26.1	11 56 50.67	1 9 30.9	0.5	1.9	0.12
14	10 26.9	12 0 45.10	0 45 46.3	0.5	1.9	0.13	30	7 22.1	11 56 49.39	1 9 36.4	0.5	1.9	0.12
15	10 22.8	12 0 36.81	0 46 38.8	0.5	1.9	0.13	31	7 18.2	11 56 48.30	1 9 40.7	0.5	1.9	0.12
16	10 18.8	12 0 28.63	+ 0 47 30.5	0.5	1.9	0.13	June 1	7 14.2	11 56 47.40	+ 1 9 43.8	0.5	1.9	0.12
17	10 14.7	12 0 20.54	0 48 21.6	0.5	1.9	0.13	2	7 10.3	11 56 46.70	1 9 45.6	0.5	1.9	0.12
18	10 10.6	12 0 12.57	0 49 11.9	0.5	1.9	0.13	3	7 6.4	11 56 46.18	1 9 46.1	0.5	1.9	0.12
19	10 6.5	12 0 4.70	0 50 1.4	0.5	1.9	0.13	4	7 2.4	11 56 45.86	1 9 45.4	0.5	1.9	0.12
20	10 2.5	11 59 56.95	0 50 50.2	0.5	1.9	0.13	5	6 58.5	11 56 45.73	1 9 43.4	0.5	1.9	0.12
21	9 58.4	11 59 49.32	+ 0 51 38.1	0.5	1.9	0.13	6	6 54.5	11 56 45.79	+ 1 9 40.1	0.5	1.9	0.12
22	9 54.4	11 59 41.81	0 52 25.2	0.5	1.9	0.13	7	6 50.6	11 56 46.05	1 9 35.6	0.5	1.9	0.12
23	9 50.3	11 59 34.42	0 53 11.5	0.5	1.9	0.13	8	6 46.7	11 56 46.51	1 9 29.8	0.5	1.9	0.12
24	9 46.3	11 59 27.16	0 53 56.9	0.5	1.9	0.13	9	6 42.8	11 56 47.16	1 9 22.7	0.5	1.9	0.12
25	9 42.2	11 59 20.03	0 54 41.4	0.5	1.9	0.13	10	6 38.9	11 56 48.00	1 9 14.4	0.5	1.8	0.12
26	9 38.2	11 59 13.03	+ 0 55 25.0	0.5	1.9	0.13	11	6 35.0	11 56 49.04	+ 1 9 4.8	0.5	1.8	0.12
27	9 34.2	11 59 6.16	0 56 7.7	0.5	1.9	0.13	12	6 31.0	11 56 50.27	1 8 53.9	0.5	1.8	0.12
28	9 30.1	11 58 59.43	0 56 49.5	0.5	1.9	0.13	13	6 27.1	11 56 51.70	1 8 41.7	0.5	1.8	0.12
29	9 26.1	11 58 52.84	0 57 30.4	0.5	1.9	0.13	14	6 23.2	11 56 53.33	1 8 28.3	0.5	1.8	0.12
30	9 22.0	11 58 46.38	0 58 10.4	0.5	1.9	0.13	15	6 19.3	11 56 55.15	1 8 13.6	0.5	1.8	0.12
May 1	9 18.0	11 58 40.07	+ 0 58 49.3	0.5	1.9	0.13	16	6 15.4	11 56 57.16	+ 1 7 57.6	0.5	1.8	0.12
2	9 14.0	11 58 33.91	0 59 27.3	0.5	1.9	0.13	17	6 11.5	11 56 59.37	1 7 40.4	0.5	1.8	0.12
3	9 9.9	11 58 27.90	1 0 4.2	0.5	1.9	0.13	18	6 7.6	11 57 1.77	1 7 21.9	0.5	1.8	0.12
4	9 5.9	11 58 22.04	1 0 40.2	0.5	1.9	0.13	19	6 3.7	11 57 4.36	1 7 2.2	0.5	1.8	0.12
5	9 1.9	11 58 16.33	1 1 15.0	0.5	1.9	0.13	20	5 59.9	11 57 7.15	1 6 41.3	0.5	1.8	0.12
6	8 57.8	11 58 10.78	+ 1 1 48.8	0.5	1.9	0.13	21	5 56.0	11 57 10.12	+ 1 6 19.1	0.5	1.8	0.12
7	8 53.8	11 58 5.39	1 2 21.6	0.5	1.9	0.13	22	5 52.1	11 57 13.29	1 5 56.6	0.5	1.8	0.12
8	8 49.8	11 58 0.16	1 2 53.3	0.5	1.9	0.13	23	5 48.2	11 57 16.65	1 5 31.0	0.5	1.8	0.12
9	8 45.8	11 57 55.09	1 3 23.9	0.5	1.9	0.13	24	5 44.3	11 57 20.20	1 5 5.1	0.5	1.8	0.12
10	8 41.8	11 57 50.19	1 3 53.4	0.5	1.9	0.13	25	5 40.5	11 57 23.94	1 4 38.0	0.5	1.8	0.12
11	8 37.8	11 57 45.45	+ 1 4 21.8	0.5	1.9	0.13	26	5 36.6	11 57 27.85	+ 1 4 9.7	0.5	1.8	0.12
12	8 33.7	11 57 40.88	1 4 49.1	0.5	1.9	0.13	27	5 32.7	11 57 31.96	1 3 40.3	0.5	1.8	0.12
13	8 29.7	11 57 36.49	1 5 15.2	0.5	1.9	0.13	28	5 28.9	11 57 36.25	1 3 9.6	0.5	1.8	0.12
14	8 25.7	11 57 32.26	1 5 40.1	0.5	1.9	0.13	29	5 25.0	11 57 40.72	1 2 37.7	0.5	1.8	0.12
15	8 21.7	11 57 28.22	1 6 4.0	0.5	1.9	0.13	30	5 21.2	11 57 45.38	1 2 4.7	0.5	1.8	0.12
16	8 17.7	11 57 24.34	+ 1 6 26.6	0.5	1.9	0.13	31	5 17.3	11 57 50.22	+ 1 1 30.5	0.5	1.8	0.12
17	8 13.8	11 57 20.65	+ 1 6 48.1	0.5	1.9	0.13	32	5 13.5	11 57 55.24	+ 1 0 55.1	0.5	1.8	0.12

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi diam.	S.T. of Sem. Pass. Mer.
Jan. 0	h m	h m s	° ' "	"	"	s	Feb. 15	h m	h m s	° ' "	"	"	s
1	8 31.8	3 15 17.36	+16 14 10.0	0.3	1.3	0.09	16	5 30.2	3 14 35.93	+16 14 19.2	0.3	1.3	0.09
2	8 27.8	3 15 13.55	16 13 58.3	0.3	1.3	0.09	17	5 26.3	3 14 38.23	16 14 32.1	0.3	1.3	0.09
3	8 23.8	3 15 9.87	16 13 47.2	0.3	1.3	0.09	18	5 22.4	3 14 40.67	16 14 45.6	0.3	1.3	0.09
4	8 19.8	3 15 6.31	16 13 36.5	0.3	1.3	0.09	19	5 18.5	3 14 43.24	16 14 59.6	0.3	1.3	0.09
5	8 15.8	3 15 2.86	16 13 26.2	0.3	1.3	0.09	20	5 14.7	3 14 45.95	16 15 14.0	0.3	1.3	0.09
6	8 11.8	3 14 59.51	+16 13 16.5	0.3	1.3	0.09	21	5 10.8	3 14 48.79	+16 15 28.9	0.3	1.3	0.09
7	8 7.8	3 14 56.28	16 13 7.3	0.3	1.3	0.09	22	5 6.9	3 14 51.77	16 15 44.3	0.3	1.3	0.09
8	8 3.9	3 14 53.17	16 12 58.5	0.3	1.3	0.09	23	5 3.0	3 14 54.88	16 16 0.3	0.3	1.3	0.09
9	7 59.9	3 14 50.19	16 12 50.2	0.3	1.3	0.09	24	4 59.1	3 14 58.12	16 16 16.8	0.3	1.3	0.09
10	7 55.9	3 14 47.35	16 12 42.5	0.3	1.3	0.09	25	4 55.3	3 15 1.48	16 16 33.7	0.3	1.3	0.09
11	7 51.9	3 14 44.62	+16 12 35.3	0.3	1.3	0.09	26	4 51.4	3 15 4.98	+16 16 51.1	0.3	1.3	0.09
12	7 47.9	3 14 42.03	16 12 28.6	0.3	1.3	0.09	27	4 47.5	3 15 8.62	16 17 9.0	0.3	1.3	0.09
13	7 44.0	3 14 39.56	16 12 22.4	0.3	1.3	0.09	28	4 43.6	3 15 12.37	16 17 27.4	0.3	1.3	0.09
14	7 40.0	3 14 37.20	16 12 16.8	0.3	1.3	0.09	29	4 39.8	3 15 16.24	+16 17 46.1	0.3	1.3	0.09
15	7 36.0	3 14 34.98	16 12 11.7	0.3	1.3	0.09							
16	7 32.0	3 14 32.90	+16 12 7.1	0.3	1.3	0.09	Sept. 1	16 47.9	3 34 45.68	+16 28 6.4	0.3	1.3	0.09
17	7 28.1	3 14 30.95	16 12 3.1	0.3	1.3	0.09	2	16 44.0	3 34 45.07	16 28 1.0	0.3	1.3	0.09
18	7 24.1	3 14 29.13	16 11 59.8	0.3	1.3	0.09	3	16 40.0	3 34 44.32	16 27 55.1	0.3	1.3	0.09
19	7 20.2	3 14 27.44	16 11 56.9	0.3	1.3	0.09	4	16 36.1	3 34 43.45	16 27 48.7	0.3	1.3	0.09
20	7 16.2	3 14 25.89	16 11 54.5	0.3	1.3	0.09	5	16 32.1	3 34 42.43	+16 27 41.8	0.3	1.3	0.09
21	7 12.3	3 14 24.47	+16 11 52.7	0.3	1.3	0.09	6	16 28.2	3 34 41.27	16 27 34.5	0.3	1.3	0.09
22	7 8.3	3 14 23.19	16 11 51.5	0.3	1.3	0.09	7	16 24.2	3 34 40.00	16 27 26.7	0.3	1.3	0.09
23	7 4.4	3 14 22.04	16 11 50.8	0.3	1.3	0.09	8	16 20.3	3 34 38.59	16 27 18.5	0.3	1.3	0.09
24	7 0.4	3 14 21.03	16 11 50.6	0.3	1.3	0.09	9	16 16.3	3 34 37.04	16 27 9.9	0.3	1.3	0.09
25	6 56.5	3 14 20.15	16 11 51.1	0.3	1.3	0.09	10	16 12.3	3 34 35.37	+16 27 0.8	0.3	1.3	0.09
26	6 52.5	3 14 19.42	+16 11 52.1	0.3	1.3	0.09	11	16 8.4	3 34 33.56	16 26 51.2	0.3	1.3	0.09
27	6 48.6	3 14 18.83	16 11 53.7	0.3	1.3	0.09	12	16 4.4	3 34 31.62	16 26 41.3	0.3	1.3	0.09
28	6 44.6	3 14 18.37	16 11 55.8	0.3	1.3	0.09	13	16 0.5	3 34 29.56	16 26 30.9	0.3	1.3	0.09
29	6 40.7	3 14 18.05	16 11 58.4	0.3	1.3	0.09	14	15 56.5	3 34 27.37	16 26 20.2	0.3	1.3	0.09
30	6 36.8	3 14 17.87	16 12 1.6	0.3	1.3	0.09	15	15 52.5	3 34 25.06	+16 26 8.9	0.3	1.3	0.09
31	6 32.8	3 14 17.83	+16 12 5.3	0.3	1.3	0.09	16	15 48.5	3 34 22.62	16 25 57.3	0.3	1.3	0.09
Feb. 1	6 28.9	3 14 17.92	16 12 9.6	0.3	1.3	0.09	17	15 44.6	3 34 20.05	16 25 45.2	0.3	1.3	0.09
2	6 25.0	3 14 18.14	16 12 14.4	0.3	1.3	0.09	18	15 40.6	3 34 17.36	16 25 32.8	0.3	1.3	0.09
3	6 21.0	3 14 18.51	16 12 19.8	0.3	1.3	0.09	19	15 36.6	3 34 14.54	16 25 20.0	0.3	1.3	0.09
4	6 17.1	3 14 19.01	16 12 25.8	0.3	1.3	0.09	20	15 32.6	3 34 11.61	+16 25 6.8	0.3	1.3	0.09
5	6 13.2	3 14 19.65	+16 12 32.2	0.3	1.3	0.09	21	15 28.7	3 34 8.55	16 24 53.0	0.3	1.3	0.09
6	6 9.3	3 14 20.44	16 12 39.3	0.3	1.3	0.09	22	15 24.7	3 34 5.37	16 24 38.9	0.3	1.3	0.09
7	6 5.4	3 14 21.36	16 12 46.8	0.3	1.3	0.09	23	15 20.7	3 34 2.08	16 24 24.6	0.3	1.3	0.09
8	6 1.5	3 14 22.43	16 12 55.0	0.3	1.3	0.09	24	15 16.7	3 33 58.67	16 24 9.8	0.3	1.3	0.09
9	5 57.5	3 14 23.63	16 13 3.7	0.3	1.3	0.09	25	15 12.7	3 33 55.16	+16 23 54.7	0.3	1.3	0.09
10	5 53.6	3 14 24.97	+16 13 12.9	0.3	1.3	0.09	26	15 8.7	3 33 51.53	16 23 39.2	0.3	1.3	0.09
11	5 49.7	3 14 26.44	16 13 22.6	0.3	1.3	0.09	27	15 4.7	3 33 47.77	16 23 23.4	0.3	1.3	0.09
12	5 45.8	3 14 28.06	16 13 32.9	0.3	1.3	0.09	28	15 0.7	3 33 43.91	16 23 7.2	0.3	1.3	0.09
13	5 41.9	3 14 29.82	16 13 43.7	0.3	1.3	0.09	29	14 56.7	3 33 39.94	16 22 50.6	0.3	1.3	0.09
14	5 38.0	3 14 31.72	16 13 55.0	0.3	1.3	0.09	30	14 52.7	3 33 35.86	+16 22 33.7	0.3	1.3	0.09
15	5 34.1	3 14 33.76	+16 14 0.8	0.3	1.3	0.09	31	14 48.7	3 33 31.68	+16 22 16.4	0.3	1.3	0.09
16	5 30.2	3 14 35.93	+16 14 19.2	0.3	1.3	0.09							

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	14 48.7	3 33 31.68	+16 22 16.4	0.3	1.3	0.09	Nov. 16	11 43.3	3 28 56.87	+16 5 2.2	0.3	1.3	0.09
2	14 44.7	3 33 27.38	16 21 58.8	0.3	1.3	0.09	17	11 39.3	3 28 50.01	16 4 37.7	0.3	1.3	0.09
3	14 40.7	3 33 22.97	16 21 40.8	0.3	1.3	0.09	18	11 35.2	3 28 43.15	16 4 13.3	0.3	1.3	0.09
4	14 36.7	3 33 18.45	16 21 22.6	0.3	1.3	0.09	19	11 31.2	3 28 36.31	16 3 49.0	0.3	1.3	0.09
5	14 32.7	3 33 13.84	16 21 4.0	0.3	1.3	0.09	20	11 27.1	3 28 29.47	16 3 24.8	0.3	1.3	0.09
6	14 28.7	3 33 9.13	+16 20 45.1	0.3	1.3	0.09	21	11 23.1	3 28 22.64	+16 3 0.7	0.3	1.3	0.09
7	14 24.7	3 33 4.33	16 20 26.0	0.3	1.3	0.09	22	11 19.0	3 28 15.83	16 2 36.7	0.3	1.3	0.09
8	14 20.7	3 32 59.42	16 20 6.6	0.3	1.3	0.09	23	11 15.0	3 28 9.04	16 2 12.8	0.3	1.3	0.09
9	14 16.7	3 32 54.42	16 19 46.8	0.3	1.3	0.09	24	11 10.9	3 28 2.27	16 1 49.0	0.3	1.3	0.09
10	14 12.6	3 32 49.33	16 19 26.8	0.3	1.3	0.09	25	11 6.9	3 27 55.52	16 1 25.4	0.3	1.3	0.09
11	14 8.6	3 32 44.16	+16 19 6.5	0.3	1.3	0.09	26	11 2.8	3 27 48.80	+16 1 1.9	0.3	1.3	0.09
12	14 4.6	3 32 38.88	16 18 46.0	0.3	1.3	0.09	27	10 58.8	3 27 42.10	16 0 36.6	0.3	1.3	0.09
13	14 0.6	3 32 33.53	16 18 25.1	0.3	1.3	0.09	28	10 54.8	3 27 35.43	16 0 15.5	0.3	1.3	0.09
14	13 56.6	3 32 28.10	16 18 4.0	0.3	1.3	0.09	29	10 50.7	3 27 28.81	15 59 52.5	0.3	1.3	0.09
15	13 52.5	3 32 22.58	16 17 42.6	0.3	1.3	0.09	30	10 46.7	3 27 22.22	15 59 29.7	0.3	1.3	0.09
16	13 48.5	3 32 16.97	+16 17 21.0	0.3	1.3	0.09	Dec. 1	10 42.6	3 27 15.67	+15 59 7.1	0.3	1.3	0.09
17	13 44.5	3 32 11.30	16 16 59.2	0.3	1.3	0.09	2	10 38.6	3 27 9.15	15 58 44.7	0.3	1.3	0.09
18	13 40.5	3 32 5.56	16 16 37.1	0.3	1.3	0.09	3	10 34.6	3 27 2.68	15 58 22.5	0.3	1.3	0.09
19	13 36.4	3 31 59.75	16 16 14.8	0.3	1.3	0.09	4	10 30.5	3 26 56.25	15 58 0.6	0.3	1.3	0.09
20	13 32.4	3 31 53.86	16 15 52.3	0.3	1.3	0.09	5	10 26.5	3 26 49.88	15 57 38.9	0.3	1.3	0.09
21	13 28.4	3 31 47.89	+16 15 29.7	0.3	1.3	0.09	6	10 22.4	3 26 43.56	+15 57 17.4	0.3	1.3	0.09
22	13 24.3	3 31 41.86	16 15 6.9	0.3	1.3	0.09	7	10 18.4	3 26 37.30	15 56 56.2	0.3	1.3	0.09
23	13 20.3	3 31 35.78	16 14 43.9	0.3	1.3	0.09	8	10 14.4	3 26 31.10	15 56 35.3	0.3	1.3	0.09
24	13 16.3	3 31 29.64	16 14 20.7	0.3	1.3	0.09	9	10 10.3	3 26 24.96	15 56 14.6	0.3	1.3	0.09
25	13 12.2	3 31 23.43	16 13 57.3	0.3	1.3	0.09	10	10 6.3	3 26 18.87	15 55 54.1	0.3	1.3	0.09
26	13 8.2	3 31 17.16	+16 13 33.9	0.3	1.3	0.09	11	10 2.3	3 26 12.86	+15 55 34.0	0.3	1.3	0.09
27	13 4.2	3 31 10.83	16 13 10.3	0.3	1.3	0.09	12	9 58.3	3 26 6.93	15 55 14.2	0.3	1.3	0.09
28	13 0.1	3 31 4.46	16 12 46.6	0.3	1.3	0.09	13	9 54.2	3 26 1.06	15 54 54.8	0.3	1.3	0.09
29	12 56.1	3 30 58.02	16 12 22.8	0.3	1.3	0.09	14	9 50.2	3 25 55.27	15 54 35.7	0.3	1.3	0.09
30	12 52.1	3 30 51.55	16 11 58.9	0.3	1.3	0.09	15	9 46.2	3 25 49.55	15 54 16.9	0.3	1.3	0.09
31	12 48.0	3 30 45.05	+16 11 34.8	0.3	1.3	0.09	16	9 42.1	3 25 43.91	+15 53 58.4	0.3	1.3	0.09
Nov. 1	12 44.0	3 30 38.51	16 11 10.6	0.3	1.3	0.09	17	9 38.1	3 25 38.35	15 53 40.2	0.3	1.3	0.09
2	12 39.9	3 30 31.90	16 10 46.3	0.3	1.3	0.09	18	9 34.1	3 25 32.87	15 53 22.3	0.3	1.3	0.09
3	12 35.9	3 30 25.26	16 10 21.9	0.3	1.3	0.09	19	9 30.1	3 25 27.48	15 53 4.8	0.3	1.3	0.09
4	12 31.8	3 30 18.58	16 9 57.5	0.3	1.3	0.09	20	9 26.0	3 25 22.18	15 52 47.7	0.3	1.3	0.09
5	12 27.8	3 30 11.87	+16 9 33.0	0.3	1.3	0.09	21	9 22.0	3 25 16.96	+15 52 31.0	0.3	1.3	0.09
6	12 23.7	3 30 5.16	16 9 8.4	0.3	1.3	0.09	22	9 18.0	3 25 11.83	15 52 14.6	0.3	1.3	0.09
7	12 19.7	3 29 58.40	16 8 43.8	0.3	1.3	0.09	23	9 14.0	3 25 6.79	15 51 58.6	0.3	1.3	0.09
8	12 15.7	3 29 51.62	16 8 19.2	0.3	1.3	0.09	24	9 10.0	3 25 1.85	15 51 43.0	0.3	1.3	0.09
9	12 11.6	3 29 44.81	16 7 54.5	0.3	1.3	0.09	25	9 6.0	3 24 57.01	15 51 27.9	0.3	1.3	0.09
10	12 7.6	3 29 37.99	+16 7 29.9	0.3	1.3	0.09	26	9 2.0	3 24 52.26	+15 51 13.2	0.3	1.3	0.09
11	12 3.5	3 29 31.15	16 7 5.2	0.3	1.3	0.09	27	8 57.9	3 24 47.62	15 50 58.9	0.3	1.3	0.09
12	11 59.5	3 29 24.30	16 6 40.5	0.3	1.3	0.09	28	8 53.9	3 24 43.08	15 50 45.0	0.3	1.3	0.09
13	11 55.4	3 29 17.45	16 6 15.9	0.3	1.3	0.09	29	8 49.9	3 24 38.64	15 50 31.6	0.3	1.3	0.09
14	11 51.4	3 29 10.59	16 5 51.3	0.3	1.3	0.09	30	8 45.9	3 24 34.31	15 50 18.6	0.3	1.3	0.09
15	11 47.3	3 29 3.73	+16 5 26.7	0.3	1.3	0.09	31	8 41.9	3 24 30.09	+15 50 6.0	0.3	1.3	0.09
16	11 43.3	3 28 56.87	+16 5 2.2	0.3	1.3	0.09	32	8 37.9	3 24 25.98	+15 49 53.8	0.3	1.3	0.09



*PART III*

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**P H E N O M E N A**

## ECLIPSES IN 1885.

In the year 1885 there will be four eclipses, two of the sun and two of the moon.

I.—*An Annular Eclipse of the Sun*, 1885, March 16, visible at Washington as a partial eclipse.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\odot$ in right ascension, March 16				<sup>d</sup> 6	<sup>h</sup> 14	<sup>m</sup> 23.6
Sun and moon's R. A.	<sup>h</sup> 23	<sup>m</sup> 46	<sup>s</sup> 35.35	Hourly motions		<sup>s</sup> 9.13 and 126.07
Sun's declination	<sup>°</sup> 1	<sup>'</sup> 27	<sup>"</sup> 12.0 S.	Hourly motion		<sup>'</sup> 0 59.3 N.
Moon's declination	<sup>°</sup> 0	<sup>'</sup> 39	<sup>"</sup> 11.0 S.	Hourly motion		<sup>'</sup> 10 21.1 N.
Sun's equa. hor. parallax	8.9			Sun's true semidiameter		16 4.1
Moon's equa. hor. parallax	<sup>'</sup> 57	<sup>"</sup> 7.7		Moon's true semidiameter		15 33.3

## CIRCUMSTANCES OF THE ECLIPSE.

Eclipse begins	March 16	<sup>d</sup> 3	<sup>h</sup> 17.9	in long. 136° 57.0 W. and in lat. 13° 30.6 N.
Central eclipse begins		<sup>h</sup> 4	<sup>m</sup> 39.6	156 39.5 W. 35 54.5 N.
Central eclipse at noon		<sup>h</sup> 6	<sup>m</sup> 14.4	91 26.8 W. 56 21.0 N.
Central eclipse ends		<sup>h</sup> 6	<sup>m</sup> 51.7	15 4.6 W. 71 24.1 N.
Eclipse ends		<sup>h</sup> 8	<sup>m</sup> 13.4	32 51.0 W. 49 6.0 N.

II.—*A Partial Eclipse of the Moon*, 1885, March 29–30, invisible at Washington; visible in the western Pacific Ocean, Asia, and the eastern portions of Europe and Africa.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\odot$ in right ascension, March 30				<sup>d</sup> 4	<sup>h</sup> 15	<sup>m</sup> 47.4
Sun's right ascension	<sup>h</sup> 0	<sup>m</sup> 37	<sup>s</sup> 14.13	Hourly motion		<sup>s</sup> 9.09
Moon's right ascension	<sup>h</sup> 12	<sup>m</sup> 37	<sup>s</sup> 14.13	Hourly motion		126.92
Sun's declination	<sup>°</sup> 4	<sup>'</sup> 0	<sup>"</sup> 50.4 N.	Hourly motion		<sup>'</sup> 0 58.1 N.
Moon's declination	<sup>°</sup> 3	<sup>'</sup> 29	<sup>"</sup> 19.4 S.	Hourly motion		<sup>'</sup> 10 12.5 S.
Sun's equa. hor. parallax	8.9			Sun's true semidiameter		16 0.3
Moon's equa. hor. parallax	<sup>'</sup> 57	<sup>"</sup> 13.3		Moon's true semidiameter		15 34.8

## TIMES OF THE PHASES.

Greenwich Mean Time.				Washington Mean Time.			
Moon enters penumbra	March	<sup>d</sup> 30	<sup>h</sup> 1 48.3	March	<sup>d</sup> 29	<sup>h</sup> 20 40.1	
Moon enters shadow			<sup>m</sup> 2 58.4			<sup>m</sup> 21 50.2	
Middle of the eclipse			<sup>m</sup> 4 34.2			<sup>m</sup> 23 26.0	
Moon leaves shadow			<sup>m</sup> 6 9.9		<sup>d</sup> 30	<sup>h</sup> 1 1.7	
Moon leaves penumbra			<sup>m</sup> 7 20.1			<sup>m</sup> 2 11.9	

## CIRCUMSTANCES OF THE ECLIPSE.

First contact of shadow with moon's limb 139° from the north point toward the east, when the moon is in the zenith in longitude 135° 53' east of Greenwich, and in latitude 3° 16' south.

Last contact of shadow with moon's limb 104° from the north point toward the west, when the moon is in the zenith in longitude 89° 32' east of Greenwich, and in latitude 3° 48' south.

Magnitude of the eclipse = 0.896, (moon's diameter = 1).

III.—*A Total Eclipse of the Sun*, 1885, September 8, invisible at Washington, but visible in the South Pacific Ocean.

*ELEMENTS OF THE ECLIPSE.*

Greenwich mean time of $\delta$ in right ascension, September				<sup>d</sup> 8	<sup>h</sup> 9	<sup>m</sup> 19	<sup>s</sup> 55.2
Sun and moon's R. A.	<sup>h</sup> 11	<sup>m</sup> 9	<sup>s</sup> 42.79	Hourly motions		<sup>s</sup> 9.00	and 138.36
Sun's declination	<sup>°</sup> 5	<sup>'</sup> 23	<sup>''</sup> 38.6 N.	Hourly motion		<sup>'</sup> 0	56.7 S.
Moon's declination	<sup>°</sup> 4	<sup>'</sup> 30	<sup>''</sup> 39.6 N.	Hourly motion		<sup>'</sup> 10	57.9 S.
Sun's equa. hor. parallax	8.8			Sun's true semidiameter		15 53.4	
Moon's equa. hor. parallax	59 42.9			Moon's true semidiameter		16 15.5	

*CIRCUMSTANCES OF THE ECLIPSE.*

Eclipse begins	September	<sup>d</sup> 8	<sup>h</sup> 6	<sup>m</sup> 36.1	in long. 171° 55.1 E. and in lat. 16° 12.2 S.
Central eclipse begins			<sup>h</sup> 7	<sup>m</sup> 56.4	154 58.2 E. 40 58.0 S.
Central eclipse at noon			<sup>h</sup> 9	<sup>m</sup> 19.9	140 38.8 W. 57 50.3 S.
Central eclipse ends			<sup>h</sup> 9	<sup>m</sup> 47.3	77 47.2 W. 74 46.9 S.
Eclipse ends			<sup>h</sup> 11	<sup>m</sup> 7.7	84 8.5 W 50 29.9 S.

IV.—*A Partial Eclipse of the Moon*, 1885, September 23, visible at Washington; also on the Atlantic Ocean, North and South America, and the Pacific Ocean.

*ELEMENTS OF THE ECLIPSE.*

Greenwich mean time of $\delta$ in right ascension, September				<sup>d</sup> 23	<sup>h</sup> 19	<sup>m</sup> 27	<sup>s</sup> 22.3
Sun's right ascension	<sup>h</sup> 12	<sup>m</sup> 5	<sup>s</sup> 7.33	Hourly motion		<sup>s</sup> 8.99	
Moon's right ascension	<sup>h</sup> 0	<sup>m</sup> 5	<sup>s</sup> 7.33	Hourly motion		122.01	
Sun's declination	<sup>°</sup> 0	<sup>'</sup> 33	<sup>''</sup> 19.9 S.	Hourly motion		<sup>'</sup> 0	58.5 S.
Moon's declination	<sup>°</sup> 0	<sup>'</sup> 0	<sup>''</sup> 30.0 S.	Hourly motion		<sup>'</sup> 10	1.3 N.
Sun's equa. hor. parallax	8.8			Sun's true semidiameter		15 57.4	
Moon's equa. hor. parallax	56 11.9			Moon's true semidiameter		14 18.2	

*TIMES OF THE PHASES.*

Greenwich Mean Time.				Washington Mean Time.			
Moon enters penumbra	September	<sup>d</sup> 23	<sup>h</sup> 17 <sup>m</sup> 0.5	September	<sup>d</sup> 23	<sup>h</sup> 11 <sup>m</sup> 52.3	
Moon enters shadow			18 14.6			13 6.4	
Middle of the eclipse			19 48.2			14 40.0	
Moon leaves shadow			21 21.9			16 13.7	
Moon leaves penumbra			22 35.9			17 27.7	

*CIRCUMSTANCES OF THE ECLIPSE.*

First contact of shadow with moon's limb 37° from the north point toward the east, when the moon is in the zenith in longitude 95° 45' west of Greenwich, and in latitude 0° 13' south.

Last contact of shadow with moon's limb 73° from the north point toward the west, when the moon is in the zenith in longitude 141° 37' west of Greenwich, and in latitude 0° 18' north.

Magnitude of the eclipse = 0.790, (moon's diameter = 1).

The regions within which the eclipses of the sun are visible are laid down on the following charts, from which may also be found the Greenwich time of beginning or ending within fifteen or twenty minutes, by means of the dotted lines.

**BESSELIAN ELEMENTS OF THE ANNULAR ECLIPSE  
OF THE SUN, 1885, MARCH 16.**

Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow On Fundamental Plane.	
	<i>x</i>	<i>y</i>	Log sin <i>d</i> .	Log cos <i>d</i> .	$\mu$	<i>l</i>	<i>l'</i>
<sup>h</sup> 3 0	-1.66160	+0.31130	-8.42007	+9.99985	42° 50.0	+0.55128	+0.00540
10	1.57615	0.33864	8.41930	9.99985	45 20.1	0.55127	0.00539
20	1.49070	0.36598	8.41853	9.99985	47 50.1	0.55126	0.00538
30	1.40524	0.39332	8.41775	9.99985	50 20.2	0.55125	0.00537
40	1.31978	0.42065	8.41697	9.99985	52 50.2	0.55124	0.00536
50	1.23432	0.44799	8.41619	9.99985	55 20.3	0.55123	0.00534
4 0	-1.14886	+0.47532	-8.41541	+9.99985	57 50.3	+0.55122	+0.00533
10	1.06339	0.50265	8.41463	9.99985	60 20.3	0.55120	0.00532
20	0.97792	0.52999	8.41385	9.99985	62 50.4	0.55119	0.00531
30	0.89245	0.55732	8.41307	9.99985	65 20.4	0.55117	0.00530
40	0.80697	0.58465	8.41229	9.99985	67 50.5	0.55116	0.00528
50	0.72149	0.61198	8.41150	9.99986	70 20.5	0.55114	0.00527
5 0	-0.63601	+0.63931	-8.41071	+9.99986	72 50.6	+0.55113	+0.00525
10	0.55052	0.66665	8.40992	9.99986	75 20.6	0.55111	0.00523
20	0.46503	0.69398	8.40913	9.99986	77 50.6	0.55110	0.00521
30	0.37954	0.72131	8.40834	9.99986	80 20.7	0.55108	0.00519
40	0.29405	0.74865	8.40755	9.99986	82 50.7	0.55106	0.00518
50	0.20856	0.77598	8.40675	9.99986	85 20.8	0.55104	0.00516
6 0	-0.12306	+0.80331	-8.40595	+9.99986	87 50.8	+0.55102	+0.00514
10	-0.03756	0.83064	8.40515	9.99986	90 20.8	0.55100	0.00512
20	+0.04794	0.85797	8.40435	9.99986	92 50.9	0.55097	0.00510
30	0.13344	0.88529	8.40355	9.99986	95 20.9	0.55095	0.00508
40	0.21894	0.91261	8.40275	9.99986	97 51.0	0.55093	0.00506
50	0.30444	0.93993	8.40195	9.99986	100 21.0	0.55091	0.00503
7 0	+0.38994	+0.96725	-8.40114	+9.99986	102 51.1	+0.55089	+0.00501
10	0.47544	0.99457	8.40033	9.99986	105 21.1	0.55087	0.00499
20	0.56094	1.02188	8.39952	9.99986	107 51.1	0.55084	0.00496
30	0.64644	1.04919	8.39871	9.99986	110 21.2	0.55082	0.00493
40	0.73194	1.07650	8.39790	9.99986	112 51.2	0.55079	0.00490
50	0.81744	1.10381	8.39709	9.99986	115 21.3	0.55077	0.00488
8 0	+0.90294	+1.13112	-8.39628	+9.99986	117 51.3	+0.55074	+0.00485
10	0.98843	1.15843	8.39546	9.99987	120 21.4	0.55071	0.00483
20	+1.07392	+1.18573	-8.39464	+9.99987	122 51.4	+0.55068	+0.00480

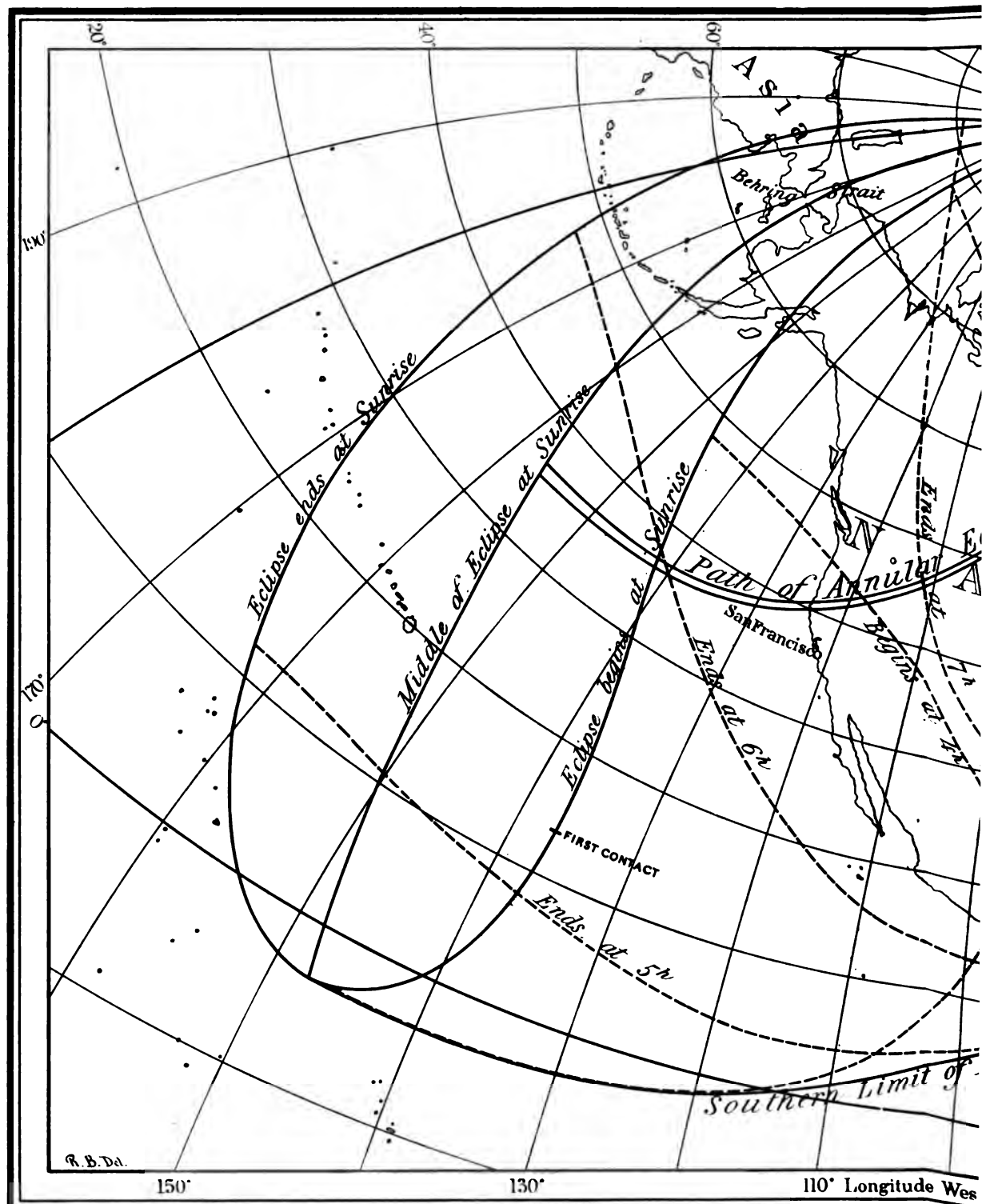
  

Greenwich Mean Time.	Log $\Delta x$ for 1 Minute.	Log $\Delta y$ for 1 Minute.	Log $\Delta \mu$ for 1 Minute.	Log Tangents of Angles of Cones—	
				Penumbra.	Shadow.
<sup>h</sup> 3	+7.9317	+7.4367	+1.1762	+7.66576	+7.66364
4	7.9318	7.4367	1.1762	7.66576	7.66365
5	7.9319	7.4367	1.1762	7.66577	7.66365
6	7.9320	7.4366	1.1762	7.66577	7.66366
7	7.9320	7.4365	1.1762	7.66578	7.66367
8	7.9319	7.4363	1.1762	7.66578	7.66367
9	+7.9318	+7.4361	+1.1762	+7.66579	+7.66368



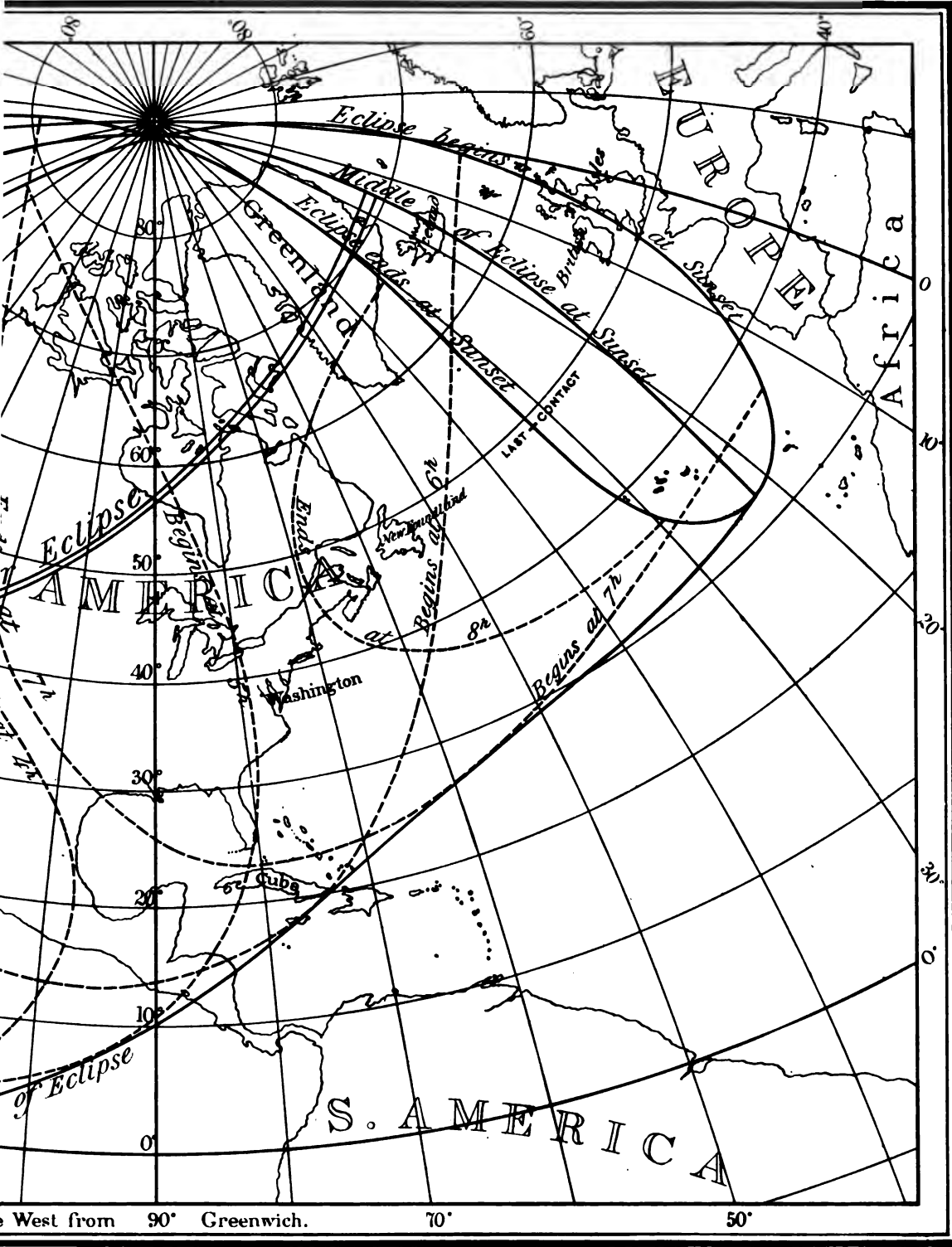


# ANNULAR ECLIPSE OF



Note.- The hours of beginning and ending an

OF MARCH 16<sup>TH</sup> 1885.



ing are expressed in Greenwich Mean Time.



PATH OF ANNULUS DURING THE ANNULAR ECLIPSE  
OF THE SUN, 1885, MARCH 16.

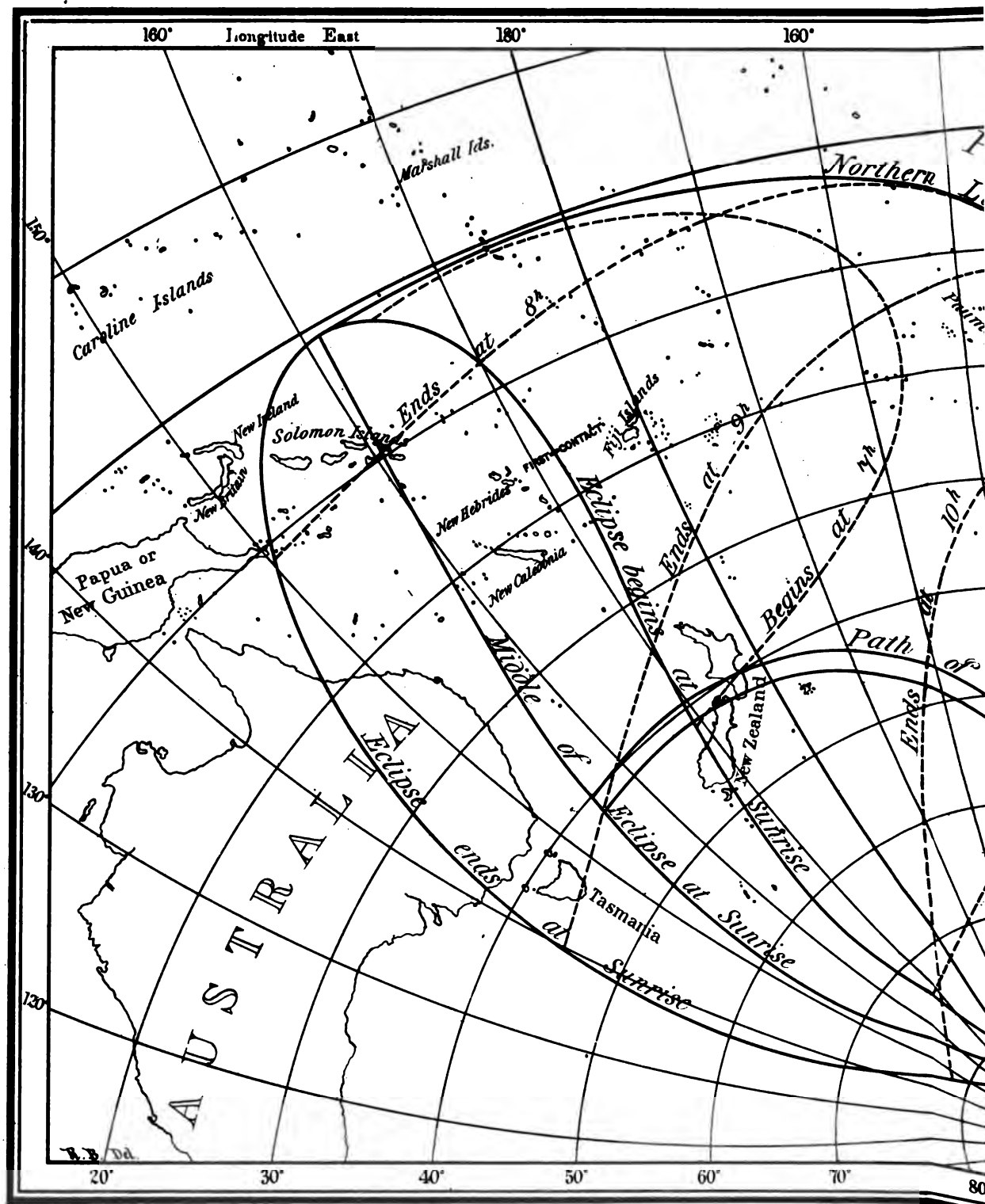
Greenwich Mean Time. •	Northern Limit of Annulus Path.		Central Line.		Southern Limit of Annulus Path.		Duration of Annulus on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
Limits	+36° 19.6	156° 47.2 W.	+35° 54.5	156° 39.5 W.	+35° 19.5	156° 26.4 W.	s
4 <sup>h</sup> 40 <sup>m</sup>			35 53.0	152 9.5	35 28.5	148 12.1	69.2
45	36 50.4	142 54.2	36 32.0	141 53.7	36 13.6	140 53.1	63.3
50	37 37.7	136 2.4	37 21.6	135 22.9	37 5.5	134 43.3	59.9
55	38 29.3	131 46.2	38 14.4	131 15.3	37 59.5	130 44.3	57.3
5 0	+39 23.4	128 16.0	+39 9.3	127 50.2	+38 55.1	127 24.4	55.0
5	40 19.4	125 16.0	40 6.0	124 54.0	39 52.6	124 32.0	53.0
10	41 17.4	122 29.4	41 4.5	122 10.0	40 51.6	121 50.5	51.3
15	42 16.8	119 57.8	42 4.4	119 40.4	41 51.9	119 23.0	49.7
20	43 17.9	117 35.5	43 5.8	117 19.7	42 53.7	117 3.8	48.5
25	44 20.6	115 19.1	44 8.8	115 4.6	43 56.9	114 50.0	47.4
5 30	+45 25.1	113 6.9	+45 13.4	112 53.4	+45 1.7	112 39.9	46.5
35	46 31.4	110 56.6	46 19.7	110 43.9	46 8.1	110 31.3	45.8
40	47 39.7	108 46.6	47 27.9	108 34.7	47 16.2	108 22.8	45.3
45	48 49.9	106 35.4	48 38.0	106 24.2	48 26.1	106 12.9	45.0
50	50 2.4	104 21.1	49 50.3	104 10.5	49 38.1	103 59.9	44.9
55	51 17.4	102 2.3	51 4.8	101 52.3	50 52.3	101 42.3	45.0
6 0	+52 35.1	99 36.3	+52 22.0	99 26.9	+52 8.9	99 17.6	45.3
5	53 55.7	97 1.2	53 41.9	96 52.5	53 28.2	96 43.9	45.8
10	55 19.5	94 13.8	55 4.9	94 6.1	54 50.3	93 58.4	46.5
15	56 47.4	91 9.8	56 31.7	91 3.2	56 16.0	90 56.7	47.3
20	58 19.9	87 44.5	58 2.8	87 39.8	57 45.6	87 35.1	48.4
25	59 57.7	83 45.3	59 38.8	83 42.9	59 19.9	83 40.5	49.8
6 30	+61 41.2	79 12.1	+61 20.2	79 14.4	+60 59.1	79 16.7	51.5
35	63 33.4	73 32.0	63 9.4	73 41.9	62 45.4	73 51.7	53.5
40	65 36.7	66 8.9	65 8.5	66 33.5	64 40.4	66 58.1	55.8
45	67 55.9	55 26.0	67 21.4	56 25.8	66 46.8	57 25.5	58.9
50	70 49.3	33 57.1	70 0.9	37 41.5	69 12.6	41 25.9	63.5
Limits	+71 40.3	15 5.3 W.	+71 24.1	15 4.6 W.	+70 40.6	15 19.7 W.	

BESSELIAN ELEMENTS OF THE TOTAL ECLIPSE  
OF THE SUN, 1885, SEPTEMBER 8.

Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow On Fundamental Plane.	
	<i>x</i>	<i>y</i>	Log sin <i>d</i> .	Log cos <i>d</i> .	$\mu$	<i>l</i>	<i>l'</i>
<sup>h</sup> <sup>m</sup> 6 30	-1.53258	-0.41172	+8.97679	+9.99804	98° 9.2	+0.53913	-0.00671
40	1.44240	0.43983	8.97659	9.99804	100 39.2	0.53917	0.00667
50	1.35222	0.46794	8.97639	9.99804	103 9.3	0.53921	0.00663
7 0	-1.26204	-0.49605	+8.97618	+9.99804	105 39.3	+0.53925	-0.00659
10	1.17185	0.52417	8.97598	9.99805	108 9.4	0.53929	0.00655
20	1.08165	0.55229	8.97578	9.99805	110 39.4	0.53933	0.00651
30	0.99146	0.58041	8.97557	9.99805	113 9.5	0.53936	0.00648
40	0.90126	0.60853	8.97537	9.99805	115 39.5	0.53939	0.00645
50	0.81107	0.63665	8.97517	9.99805	118 9.6	0.53942	0.00642
8 0	-0.72087	-0.66477	+8.97496	+9.99806	120 39.6	+0.53945	-0.00639
10	0.63067	0.69288	8.97476	9.99806	123 9.7	0.53948	0.00636
20	0.54047	0.72099	8.97455	9.99806	125 39.7	0.53951	0.00633
30	0.45027	0.74910	8.97435	9.99806	128 9.8	0.53953	0.00631
40	0.36007	0.77721	8.97414	9.99806	130 39.8	0.53955	0.00629
50	0.26987	0.80531	8.97394	9.99807	133 9.9	0.53957	0.00627
9 0	-0.17967	-0.83341	+8.97373	+9.99807	135 39.9	+0.53959	-0.00625
10	-0.08947	0.86151	8.97353	9.99807	138 10.0	0.53961	0.00623
20	+0.00073	0.88960	8.97332	9.99807	140 40.0	0.53963	0.00621
30	0.09092	0.91769	8.97312	9.99807	143 10.1	0.53964	0.00620
40	0.18112	0.94577	8.97291	9.99807	145 40.1	0.53965	0.00619
50	0.27132	0.97384	8.97271	9.99808	148 10.2	0.53966	0.00618
10 0	+0.36151	-1.00191	+8.97250	+9.99808	150 40.2	+0.53967	-0.00617
10	0.45169	1.02998	8.97230	9.99808	153 10.3	0.53967	0.00617
20	0.54187	1.05804	8.97209	9.99808	155 40.3	0.53968	0.00616
30	0.63204	1.08609	8.97188	9.99808	158 10.4	0.53968	0.00616
40	0.72222	1.11414	8.97168	9.99809	160 40.4	0.53969	0.00615
50	0.81240	1.14218	8.97147	9.99809	163 10.5	0.53969	0.00615
11 0	+0.90257	-1.17022	+8.97126	+9.99809	165 40.5	+0.53969	-0.00615
10	+0.99273	-1.19825	+8.97106	+9.99809	168 10.6	+0.53969	-0.00615
Greenwich Mean Time.	Log $\Delta x$ for 1 Minute.	Log $\Delta y$ for 1 Minute.	Log $\Delta \mu$ for 1 Minute.	Log Tangents of Angles of Cones—			
				Penumbra.	Shadow.		
<sup>h</sup> 6	+7.9550	-7.4486	+1.1762	+7.66691	+7.66479		
7	7.9551	7.4490	1.1762	7.66691	7.66480		
8	7.9552	7.4489	1.1762	7.66692	7.66480		
9	7.9552	7.4487	1.1762	7.66692	7.66481		
10	7.9551	7.4482	1.1762	7.66693	7.66481		
11	7.9551	7.4476	1.1762	7.66693	7.66482		
12	+7.9549	-7.4467	+1.1762	+7.66694	+7.66482		



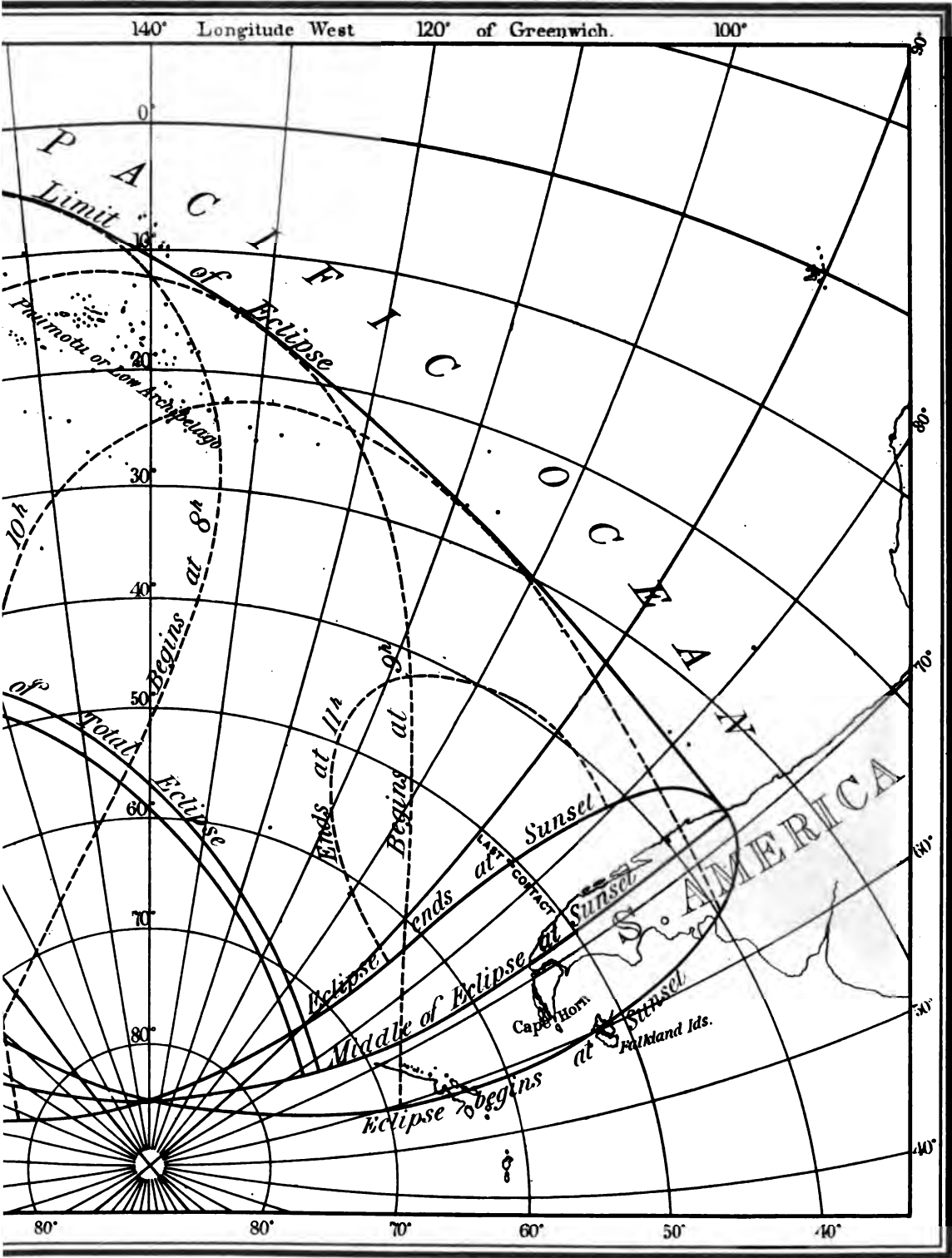
# TOTAL ECLIPSE OF SE



Note.-The hours of beginning and ending are e



# SEPTEMBER 8<sup>TH</sup> 1885.



are expressed in Greenwich Mean Time.



PATH OF SHADOW DURING THE TOTAL ECLIPSE  
OF THE SUN, 1885, SEPTEMBER 8.

Greenwich Mean Time.	Northern Limit of Shadow Path.		Central Line.		Southern Limit of Shadow Path.		Duration of Totality on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
Limits	—40° 7.0	155° 10.6 E.	—40° 58.0	154° 58.2 E.	—41° 28.8	154° 52.3 E.	m s
8 <sup>h</sup> 0 <sup>m</sup>	39 26.7	170 50.9 E.	40 20.8	168 31.2	41 14.8	166 11.4	1 44.4
5	40 1.2	176 45.2	40 44.1	175 8.7	41 27.0	173 32.2	1 55.9
10	40 38.1	178 51.0 W.	41 20.9	179 49.0 E.	42 3.7	178 29.0 E.	2 4.1
15	41 21.7	175 12.9	42 4.9	176 23.6 W.	42 48.1	177 34.3 W.	2 10.6
20	42 10.2	172 2.2	42 53.9	173 0.6	43 37.7	174 11.1	2 15.9
25	43 2.8	169 10.1	43 47.2	170 10.1	44 31.6	171 10.2	2 20.2
8 30	—43 58.9	166 29.1	—44 44.0	167 25.2	—45 29.2	168 21.2	2 23.7
35	44 58.4	163 56.8	45 44.3	164 49.7	46 30.3	165 42.6	2 26.3
40	46 1.4	161 30.2	46 48.2	162 20.3	47 35.0	163 10.4	2 28.1
45	47 7.8	159 6.3	47 55.5	159 53.7	48 43.3	160 41.0	2 29.2
50	48 17.8	156 43.0	49 6.6	157 27.7	49 55.4	158 12.4	2 29.6
55	49 31.5	154 18.2	50 21.4	155 0.2	51 11.3	155 42.2	2 29.3
9 0	—50 49.4	151 49.4	—51 40.6	152 28.4	—52 31.7	153 7.5	2 28.3
5	52 11.8	149 14.0	53 4.4	149 49.8	53 56.9	150 25.6	2 26.6
10	53 39.5	146 29.6	54 33.7	147 1.4	55 27.8	147 33.1	2 24.1
15	55 13.1	143 30.8	56 9.2	143 57.7	57 5.3	144 24.7	2 20.9
20	56 53.6	140 15.0	57 52.0	140 35.3	58 50.3	140 55.6	2 16.9
25	58 43.3	136 31.0	59 44.6	136 42.8	60 45.8	136 54.6	2 12.0
9 30	—60 44.1	132 7.2	—61 49.1	132 5.7	—62 54.1	132 4.2	2 6.2
35	63 1.5	126 40.1	64 11.3	126 16.0	65 21.1	125 51.9	1 59.1
40	65 42.7	119 17.1	67 2.4	118 5.3	68 22.1	116 53.5	1 50.0
45	69 11.2	107 30.5	70 57.1	103 12.4	72 42.9	98 54.3	1 36.8
Limits	—73 55.8	77 0.1 W.	—74 46.9	77 47.2 W.	—75 11.4	78 16.1 W.	

## WASHINGTON MEAN TIME.

## PHASES OF THE MOON.

New Moon.			First Quarter.			Full Moon.			Last Quarter.						
d	h	m	d	h	m	d	h	m	d	h	m				
January	15	15	28.3	January	23	8	18.1	January	29	23	11.0	January	7	10	28.4
February	14	9	13.6	February	21	17	22.8	February	28	10	52.1	February	6	5	29.4
March	16	0	28.7	March	23	0	14.9	March	29	23	31.8	March	8	1	45.9
April	14	12	43.6	April	21	6	11.9	April	28	13	6.0	April	6	21	34.2
May	13	22	9.3	May	20	12	36.9	May	28	3	22.7	May	6	15	34.8
June	12	5	33.9	June	18	20	40.2	June	26	18	9.7	June	5	6	56.6
July	11	12	7.6	July	18	7	11.6	July	26	9	14.6	July	4	19	17.8
August	9	19	5.7	August	16	20	38.6	August	25	0	17.0	August	3	4	47.5
September	8	3	35.0	September	15	13	6.6	September	23	14	46.5	September	1	12	6.6
October	7	14	23.2	October	15	8	12.4	October	23	4	14.4	September	30	18	20.9
November	6	3	54.5	November	14	4	51.4	November	21	16	31.1	October	30	0	49.6
December	5	20	8.4	December	14	1	13.6	December	21	3	50.4	November	28	8	48.9
												December	27	19	13.5

## APOGEE, PERIGEE, AND GREATEST LIBRATION.

Apogee.		Perigee.		Greatest Libration.			
	d h		d h		d h m		d h m
January	12 15.7	January	28 8.7	January	5 20 23 W.	January	21 15 46 E.
February	9 7.4	February	25 6.4	February	3 3 2 W.	February	17 9 55 E.
March	9 3.2	March	23 3.9	March	3 2 27 W.	March	15 17 8 E.
April	5 23.5	April	17 21.8	March	30 3 5 W.	April	12 0 36 E.
May	3 17.3	May	15 16.9	April	25 19 30 W.	May	9 21 41 E.
May	31 6.9	June	12 23.2	May	22 12 37 W.	June	7 0 47 E.
June	27 12.9	July	11 8.4	June	19 6 14 W.	July	5 5 24 E.
July	24 16.3	August	8 17.3	July	17 9 23 W.	August	2 6 15 E.
August	21 0.9	September	5 21.0	August	14 13 55 W.	August	29 17 17 E.
September	17 17.4	October	3 6.0	September	11 15 36 W.	September	25 0 57 E.
October	15 12.5	October	28 2.6	October	9 4 44 W.	October	21 18 16 E.
November	12 9.1	November	24 3.5	November	5 8 1 W.	November	18 9 36 E.
December	10 4.5	December	22 8.2	December	1 11 34 W.	December	16 12 44 E.
				December	28 19 8 W.		

## FORMULÆ FOR THE LIBRATION OF THE MOON.

Put  $I$ , the inclination of the moon's equator to the ecliptic ( $= 1^\circ 28'.8$ ),

$\Omega$ , the mean longitude of the moon's ascending node, (see page 278), or the mean longitude of the descending node of the moon's equator,

$C$ , the angle at the centre of the moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk,

$\lambda, \beta, \alpha', \delta'$ , the apparent longitude, latitude, right ascension, and declination of the moon, corrected for parallax,

$\lambda'$ , the selenocentric longitude of the earth, counted on the moon's equator from its descending node,  $\Omega$ ,

$i, \Delta, \Omega', \zeta$ , the quantities defined on page 276, where their values for the year are given.

The moon's libration in longitude and latitude may then be found, for any time, by means of the following formulæ, in connection with the tables given on pages 276 and 277:—

$$\left. \begin{aligned} \Delta \lambda &= -0'.57 \sin 2(\Omega - \lambda) \\ \alpha &= \sin I \cos(\Omega - \lambda) \\ \tan B &= \tan I \sin(\Omega - \lambda) \\ \lambda' &= \lambda + \Delta \lambda + \alpha b \end{aligned} \right\} \text{See table, page 277.}$$

The libration in latitude  $= b = B - \beta$

The libration in longitude  $= l = \lambda' - \zeta$

$$\sin C = \sin i \frac{\cos(\lambda' + \Delta - \Omega)}{\cos \delta'} = -\sin i \frac{\cos(\alpha' - \Omega)}{\cos b}$$

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\pi'$	$\gamma'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
W. vii. 685	6	+1.58	-12.4	+17 19.7	1 3 1.0	- 9 37.7	-0.2713	0.6148	-0.0791	+19	-38
68 Geminorum	5½	1.58	12.5	16 4.2	3 43.8	- 8 56.6	+0.9059	0.6144	0.0811	+90	+30
f Geminorum	6	1.58	12.5	17 55.9	5 56.7	- 6 49.2	-1.1061	0.6135	0.0851	-36	-72
1 Cancri	6	1.54	12.6	16 5.6	12 43.9	- 0 18.5	+0.0770	0.6099	0.0981	+39	-20
5 Cancri	6½	1.54	12.6	16 46.1	14 28.3	+ 1 21.7	-0.7630	0.6087	0.1017	- 9	-74
29 Cancri	6	+1.44	-12.7	+14 35.2	2 1 10.3	+11 38.2	+0.2010	0.6026	-0.1199	+47	-15
A¹ Cancri	6	1.41	12.3	13 5.3	7 1.3	- 6 44.5	+0.9568	0.5967	0.1290	+90	+28
a Cancri	4	1.36	12.2	12 17.9	13 13.4	- 0 46.7	+0.9149	0.5947	0.1379	+90	+24
ξ Leonis	5½	1.24	11.8	11 48.3	3 3 6.5	-11 24.8	-0.6316	0.5848	0.1549	- 1	-73
h Leonis	5½	1.25	11.5	10 13.2	3 7.7	-11 23.6	+0.9541	0.5848	0.1549	+90	+25
o Leonis	3½	+1.21	-11.4	+10 24.7	7 1.6	- 7 38.3	+0.1524	0.5820	-0.1590	+44	-22
B. A. C. 3396	6	1.15	11.0	9 28.4	13 34.7	- 1 19.5	+0.0353	0.5773	0.1651	+36	-29
B. A. C. 3407	6	1.15	10.8	8 51.5	14 18.7	- 0 37.1	+0.5353	0.5769	0.1655	+70	- 2
π Leonis	5	1.14	10.6	8 35.5	15 13.2	+ 0 15.4	+0.6552	0.5764	0.1662	+83	+ 4
43 Leonis	6½	1.05	9.7	7 7.3	4 1 13.6	+ 9 54.6	+0.4477	0.5697	0.1732	+63	- 8
48 Leonis	5½	+1.00	- 9.6	+ 7 32.6	6 29.1	- 9 0.8	-0.9018	0.5656	-0.1763	-17	-83
35 Sextantis	6½	0.97	8.7	5 20.9	10 20.7	- 5 17.2	+0.6585	0.5636	0.1770	+83	+ 3
d Leonis	4½	0.91	7.8	4 14.0	18 11.7	+ 2 17.9	+0.3966	0.5593	0.1807	+59	-12
75 Leonis	5½	0.86	6.7	2 38.5	5 1 56.7	+ 9 47.5	+0.6349	0.5547	0.1824	+80	+ 1
76 Leonis	6½	0.85	6.6	2 16.7	2 42.6	+10 31.9	+0.8718	0.5540	0.1825	+90	+15
79 Leonis	5½	+0.83	- 6.3	+ 2 2.2	5 6.2	-11 9.3	+0.6881	0.5530	-0.1827	+86	+ 4
τ Leonis	5	0.79	- 6.7	+ 3 29.2	6 55.6	- 9 23.4	-1.1529	0.5521	0.1830	-36	-87
θ Virginis	4½	0.34	+ 0.1	- 4 55.5	7 8 28.3	- 9 24.6	-1.1606	0.5359	0.1690	-38	-90
81 Virginis	5½	0.23	2.1	7 17.2	22 14.2	+ 3 56.0	-0.8921	0.5346	0.1602	-18	-90
m Virginis	5½	0.21	2.4	8 7.4	8 0 14.7	+ 5 52.8	-0.3067	0.5346	0.1586	+15	-53
B. A. C. 4591	6	+0.19	+ 3.1	- 9 7.8	3 1.9	+ 8 34.9	+0.3432	0.5344	-0.1564	+53	-16
W. xiii. 825	6	0.14	3.3	8 59.5	7 19.7	-11 15.2	-0.4686	0.5342	0.1529	+ 6	-65
96 Virginis	6½	0.07	4.1	9 47.3	13 56.1	- 4 50.9	-0.5954	0.5342	0.1472	- 2	-76
κ Virginis	4½	+0.05	4.2	9 44.3	15 52.8	- 2 57.8	-0.9340	0.5342	0.1453	-23	-90
2 Libræ	6	+0.02	5.0	11 11.2	21 7.8	+ 2 7.7	-0.1074	0.5344	0.1406	+24	-41
μ Libræ	6	-0.09	+ 6.6	-13 40.0	9 10 2.3	- 9 21.5	+0.8818	0.5352	-0.1275	+77	+16
o¹ Libræ	6	0.24	7.8	15 8.0	10 1 46.5	+ 5 53.7	+0.6324	0.5373	0.1094	+69	+ 1
o³ Libræ	6	0.26	7.8	14 43.3	2 46.7	+ 6 52.1	+0.0699	0.5373	0.1081	+31	-31
γ Libræ	4½	0.33	8.0	14 24.2	8 58.1	-11 8.0	-0.9301	0.5382	0.1007	-28	-90
η Libræ	6	0.36	8.2	15 18.3	13 10.9	- 7 3.0	-0.3447	0.5388	0.0955	+ 6	-56
θ Libræ	4½	-0.41	+ 8.7	-16 23.4	17 57.3	- 2 25.5	+0.4171	0.5395	-0.0891	+50	-11
49 Libræ	6	0.44	8.8	16 11.5	21 12.1	+ 0 43.2	-0.0868	0.5404	0.0849	+19	-40
χ Ophiuchi	6	0.55	9.4	18 11.5	11 10 11.7	-10 41.6	+1.1487	0.5421	0.0669	+72	+40
φ Ophiuchi	5	0.58	9.1	16 21.4	12 14.9	- 8 42.2	-1.0214	0.5425	0.0640	-39	-90
24 Scorpii	5	0.62	9.3	17 30.9	17 18.2	- 3 48.4	-0.0389	0.5434	0.0567	+19	-37
29 Ophiuchi	6	-0.70	+ 9.6	-18 42.6	12 3 7.3	+ 5 42.2	+0.8041	0.5449	-0.0421	+72	+12
B. A. C. 6060	6	0.90	9.3	18 46.6	13 5 12.2	+ 6 57.3	+0.3075	0.5476	-0.0019	+34	-17
B. A. C. 6294	6	0.98	8.6	18 28.8	22 17.3	- 0 30.4	+0.1795	0.5486	+0.0248	+28	-24
NEW MOON.					17 3 11.5	+ 1 57.9	-0.8948	0.5420	0.1307	-22	-90
ν Aquarii	4½	0.97	3.3	11 50.0	20 42.4	- 5 3.9	-0.9158	0.5399	+0.1482	-22	-90
B. A. C. 7562	6½	-0.89	+ 2.3	- 9 34.0	20 44.9	- 5 1.4	-0.8612	0.5399	0.1482	-18	-90
c¹ Capricorni	5	0.88	2.1	9 36.6	21 23.9	- 4 23.6	-0.5531	0.5399	0.1488	+ 1	-72
c² Capricorni	6	0.88	2.1	9 48.3	18 1 0.2	- 0 54.0	+1.1264	0.5396	0.1518	+80	+35
B. A. C. 7620	6	0.88	1.6	10 51.1	12 34.9	+10 19.2	+0.2255	0.5388	0.1607	+46	-22
θ Aquarii	4½	0.79	1.0	8 21.3	14 15.9	+11 57.3	+0.5426	0.5388	+0.1617	+68	- 5
ρ Aquarii	5½	-0.78	+ 0.9	- 8 23.8	19 47.8	- 6 41.2	+0.0882	0.5384	0.1656	+38	-30
Lalande 43974	6	0.73	+ 0.6	7 8.3	19 17 51.8	- 9 17.8	+0.6210	0.5387	0.1762	+77	0
B. A. C. 8094	5½	0.52	- 0.7	4 7.3	20 0 44.8	- 2 37.6	+0.0196	0.5392	0.1781	+35	-33
11 Piscium	6½	0.44	0.9	2 25.3	1 59.2	- 1 25.4	-0.5070	0.5395	0.1784	+ 7	-68
13 Piscium	6½	0.42	0.7	1 43.2	3 3.9	- 0 22.9	-0.1422	0.5306	+0.1786	+26	-43
14 Piscium	6	-0.42	- 0.9	- 1 52.9	10 37.5	+ 6 56.6	-1.2514	0.5408	+0.1801	-48	-90
21 Piscium	6	-0.32	- 0.9	+ 0 26.1							

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## JANUARY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
44 Piscium	6	-0.15	-2.0	+ 1 18.2	21 4 10.0	- 0 3.9	+0.9919	0.5448	+0.1799	+90	+23
B. A. C. 221	6	0.00	2.1	4 41.3	15 9.0	+10 34.1	-0.6052	0.5478	0.1777	+ 2	-76
B. A. C. 274	6 $\frac{1}{2}$	+0.08	2.0	5 51.7	20 38.1	- 8 7.5	-0.8636	0.5499	0.1757	-14	-85
73 Piscium	6 $\frac{1}{2}$	0.10	2.6	5 2.3	23 1.7	- 5 48.5	+0.4165	0.5507	0.1750	+61	-11
77 Piscium	6	0.10	2.9	4 17.8	23 28.6	- 5 22.5	+1.2703	0.5513	0.1746	+90	+52
e Piscium	5 $\frac{1}{2}$	+0.11	-2.5	+ 5 2.5	23 0 41.4	- 4 12.0	-0.7034	0.5514	+0.1742	+89	+ 6
$\zeta$ Piscium	4 $\frac{1}{2}$	0.17	2.3	6 58.0	3 10.4	- 1 47.9	-0.8748	0.5524	0.1731	-15	-83
88 Piscium	6	0.16	2.6	6 23.3	3 38.5	- 1 20.8	-0.1912	0.5527	0.1728	+24	-43
B. A. C. 410	6	0.21	2.7	6 48.6	7 29.0	+ 2 22.2	+0.0312	0.5546	0.1708	+36	-32
96 Piscium	6 $\frac{1}{2}$	0.25	3.1	6 41.9	10 19.8	+ 5 7.2	+0.6311	0.5556	0.1693	+80	+ 2
o Piscium	4 $\frac{1}{2}$	+0.36	- 3.0	+ 8 34.6	17 49.9	-11 37.6	-0.0673	0.5595	+0.1644	+31	-36
$\xi$ Arietis	5 $\frac{1}{2}$	0.58	4.2	10 5.2	23 11 32.7	+ 5 28.6	+1.1556	0.5693	0.1490	+90	+42
31 Arietis	5 $\frac{1}{2}$	0.66	4.0	11 56.9	16 41.9	+10 27.0	0.0000	0.5722	0.1438	+35	-30
38 Arietis	5	0.72	4.4	11 57.6	20 20.2	-10 2.4	+0.5027	0.5741	0.1399	+68	- 2
Lalande 5725	6	0.84	5.0	12 44.8	24 5 32.4	- 1 10.0	+0.9311	0.5799	0.1278	+90	+26
B. A. C. 1119	6	+1.04	- 5.2	+16 9.7	19 20.9	-11 52.1	-0.8997	0.5880	+0.1084	-18	-74
B. A. C. 1272	6	1.19	6.2	17 1.8	25 7 1.2	- 0 38.4	-0.6217	0.5952	0.0897	- 1	-65
$\delta$ Tauri	4	1.26	6.8	17 16.2	13 1.4	+ 5 7.9	-0.3626	0.5981	0.0779	+14	-44
63 Tauri	6	1.25	7.0	16 30.4	13 13.8	+ 5 19.8	+0.4194	0.5983	0.0775	+62	0
$\delta$ Tauri	5 $\frac{1}{2}$	1.27	6.9	17 10.5	13 29.3	+ 5 34.7	-0.2306	0.5987	0.0764	+22	-36
$\rho$ Tauri	5	+1.27	- 6.8	+17 39.8	14 2.3	+ 6 6.3	-0.6782	0.5988	+0.0758	- 4	-69
75 Tauri	6	1.27	7.4	16 6.0	15 15.0	+ 7 16.2	+0.9783	0.5993	0.0738	+90	+35
$\alpha$ Tauri	1	1.32	7.6	16 16.6	18 13.2	+10 7.5	+1.0106	0.6011	0.0684	+90	+38
B. A. C. 1468	6	1.38	7.5	18 31.4	22 16.6	- 9 58.7	-0.9757	0.6030	0.0603	-25	-72
i Tauri	5 $\frac{1}{2}$	1.41	7.6	18 38.5	26 0 16.9	- 8 3.2	-0.9783	0.6038	0.0562	-25	-72
B. A. C. 1526	5 $\frac{1}{2}$	+1.41	- 8.3	+16 58.2	2 40.4	- 5 45.3	+0.8179	0.6049	+0.0510	+90	+26
m Tauri	5 $\frac{1}{2}$	1.47	8.3	18 29.3	6 33.6	- 2 1.4	-0.5130	0.6067	0.0430	+ 5	-52
111 Tauri	5 $\frac{1}{2}$	1.52	9.3	17 16.4	13 11.7	+ 4 20.8	+0.9378	0.6091	0.0293	+90	+37
115 Tauri	6	1.53	9.4	17 16.1	14 15.5	+ 5 22.0	+0.3941	0.6094	0.0273	+59	+ 3
117 Tauri	6 $\frac{1}{2}$	1.53	9.5	17 8.4	14 36.2	+ 5 41.8	+1.1079	0.6095	0.0260	+90	+50
119 Tauri	5	+1.55	- 9.3	+18 30.2	16 11.9	+ 7 13.7	-0.2069	0.6101	+0.0232	+23	-30
120 Tauri	6	1.55	9.3	18 27.3	16 42.4	+ 7 43.0	-0.1472	0.6102	0.0217	+26	-26
127 Tauri	6 $\frac{1}{2}$	1.58	9.6	18 55.3	20 18.8	+11 10.6	-0.5474	0.6113	0.0144	+ 3	-52
130 Tauri	6	1.59	10.0	17 40.9	22 4.8	-11 7.7	+0.7041	0.6116	+0.0103	+90	+23
71 Orionis	6	1.68	10.6	19 11.4	27 8 34.0	- 1 4.1	-0.8048	0.6137	-0.0132	-13	-71
26 Geminorum	5 $\frac{1}{2}$	+1.73	-11.9	+17 45.2	19 7.8	+ 9 3.8	+0.3556	0.6141	-0.0359	+57	+ 1
51 Geminorum	5 $\frac{1}{2}$	1.77	12.9	16 21.0	28 7 1.6	- 3 31.5	+1.1582	0.6130	0.0615	+90	+52
$\lambda$ Geminorum	4	1.78	13.0	16 44.7	8 50.3	- 1 47.2	+0.6531	0.6127	0.0655	+85	+15
W. vii. 685	6	1.80	13.3	17 19.7	14 6.7	+ 8 16.4	-0.2945	0.6113	0.0760	+18	-40
68 Geminorum	5 $\frac{1}{2}$	1.80	13.5	16 4.2	14 50.0	+ 3 57.9	+0.8900	0.6112	0.0777	+90	+29
f Geminorum	6	+1.81	-13.4	+17 55.9	17 4.4	+ 6 6.8	-1.1256	0.6106	-0.0820	-38	-72
1 Cancri	6	1.81	13.9	16 5.6	23 55.3	-11 18.7	+0.0807	0.6082	0.0953	+39	-20
5 Cancri	6 $\frac{1}{2}$	1.82	13.9	16 46.1	29 1 40.3	- 9 38.0	-0.7575	0.6075	0.0968	- 9	-74
29 Cancri	6	1.80	14.3	14 35.2	12 23.9	+ 0 40.2	+0.2392	0.6027	0.1178	+49	-13
$\Delta$ Cancri	6	1.79	14.4	13 5.3	18 14.6	+ 6 17.1	+1.0116	0.6007	0.1268	+90	+33
$\alpha$ Cancri	4	+1.78	-14.4	+12 17.9	30 0 24.7	-11 47.1	+0.9833	0.5971	-0.1365	+90	+29
$\xi$ Leonis	5 $\frac{1}{2}$	1.74	14.3	11 48.3	14 9.5	+ 1 26.4	-0.5208	0.5899	0.1537	+ 6	-63
$\lambda$ Leonis	5 $\frac{1}{2}$	1.75	14.2	10 13.2	14 10.7	+ 1 27.6	+1.0580	0.5898	0.1537	+90	+33
o Leonis	3 $\frac{1}{2}$	1.74	14.3	10 24.7	18 1.3	+ 5 9.5	+0.2683	0.5875	0.1580	+51	-16
B. A. C. 3398	6	1.72	14.1	9 28.4	31 0 27.9	+11 21.9	+0.1688	0.5835	0.1644	+44	-22
B. A. C. 3407	6	+1.72	-14.1	+ 8 51.5	1 11.1	-11 56.5	+0.6671	0.5834	-0.1650	+84	+ 5
$\pi$ Leonis	5	1.71	14.0	8 35.5	2 4.7	-11 4.8	+0.7877	0.5828	0.1658	+90	+13
43 Leonis	6 $\frac{1}{2}$	1.67	13.5	7 7.3	11 52.8	- 1 37.9	+0.6036	0.5772	0.1736	+77	+ 1
48 Leonis	5 $\frac{1}{2}$	1.64	13.3	7 32.6	17 1.1	+ 3 19.4	-0.7218	0.5744	-0.1767	- 6	-83
35 Sextantis	6 $\frac{1}{2}$	1.62	12.9	5 20.8	20 46.9	+ 6 57.3	+0.8350	0.5723	0.1788	+90	+14
37 Sextantis	6 $\frac{1}{2}$	+1.60	-13.1	+ 6 58.5	21 59.2	+ 8 7.1	-1.0335	0.5716	-0.1793	-26	-83
38 Sextantis	6	+1.60	-13.0	+ 6 57.0	22 31.9	+ 8 38.5	-1.1064	0.5710	-0.1795	-32	-83

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
d Leonis	4½	+1.57	-12.1	+ 4 13.9	1 4 25.9	- 9 39.7	+0.5906	0.5678	-0.1818	+75	- 1
75 Leonis	5½	1.55	11.3	2 38.4	11 58.2	- 2 23.0	+0.8406	0.5639	0.1839	+90	+13
76 Leonis	6½	1.54	11.2	2 16.6	12 42.8	- 1 39.9	+1.0767	0.5636	0.1840	+90	+30
79 Leonis	5½	1.53	11.0	2 2.1	15 2.3	+ 0 34.8	+0.8972	0.5627	0.1844	+90	+17
r Leonis	5	1.49	11.2	+ 3 29.1	16 48.5	+ 2 17.4	-0.9170	0.5618	0.1846	-18	-87
URANUS				- 0 19.7	2 15 24.8	+ 0 8.9	-1.1548	0.5511	-0.1828	-37	-90
θ Virginis	4½	+1.17	- 5.1	4 55.6	3 16 54.1	+ 0 49.0	-0.8688	0.5445	0.1712	-16	-90
81 Virginis	5½	1.07	3.1	7 17.3	4 6 18.3	-10 12.1	-0.5965	0.5421	0.1620	0	-76
m Virginis	5½	1.06	2.7	8 7.4	8 15.9	- 8 18.2	-0.0196	0.5419	0.1604	+31	-36
B. A. C. 4591	6	1.04	2.1	9 7.9	10 59.1	- 5 40.2	+0.6267	0.5413	0.1582	+75	0
W. xiii. 825	6	+1.00	- 1.7	- 8 59.6	15 11.1	- 1 36.0	-0.1790	0.5407	-0.1581	+22	-45
95 Virginis	6	0.96	1.3	8 45.8	20 32.4	+ 3 35.3	-1.2422	0.5403	0.1497	-51	-90
96 Virginis	6½	0.95	0.9	9 47.4	21 38.8	+ 4 39.6	-0.3018	0.5401	0.1487	+14	-53
κ Virginis	4½	0.92	- 0.7	9 44.4	23 33.0	+ 6 30.2	-0.6383	0.5399	0.1469	- 4	-81
2 Libræ	6	0.89	+ 0.1	11 11.3	5 4 42.0	+11 29.5	+0.1803	0.5396	0.1421	+41	-24
μ Libræ	6	+0.79	+ 2.0	-13 40.1	17 23.3	- 0 12.8	+1.1572	0.5392	-0.1284	+77	+39
o Libræ	6	0.62	3.8	15 8.0	6 8 55.5	- 0 9.7	+0.8978	0.5395	0.1106	+75	+18
o² Libræ	6	0.61	3.7	14 43.3	9 55.2	- 8 11.8	+0.3396	0.5395	0.1096	+47	-15
γ Libræ	4½	0.54	4.1	14 24.2	16 3.0	- 2 15.5	-0.6569	0.5398	0.1020	-10	-85
η Libræ	6	0.49	4.5	15 18.3	20 13.8	+ 1 47.5	-0.0806	0.5401	0.0968	+21	-39
θ Libræ	4½	+0.45	+ 5.2	-16 23.4	7 0 58.2	+ 6 23.0	+0.6714	0.5405	-0.0903	+71	+ 4
49 Libræ	6	0.41	5.4	16 11.5	4 11.9	+ 9 30.6	+0.1671	0.5409	0.0859	+34	-25
φ Ophiuchi	5	0.25	6.1	16 21.5	19 11.4	+ 0 1.9	-0.7794	0.5421	0.0650	-22	-90
24 Scorpii	5	0.20	6.7	17 31.0	8 0 14.1	+ 4 55.1	+0.1919	0.5428	0.0579	+32	-23
20 Ophiuchi	6	+0.09	7.4	18 42.7	10 3.0	- 9 34.6	+1.0214	0.5437	0.0432	+72	+29
B. A. C. 6060	6	-0.19	+ 7.9	-18 46.7	9 12 10.3	- 8 17.0	+0.4863	0.5462	-0.0035	+47	- 7
B. A. C. 6294	6	0.36	7.6	18 28.8	10 5 17.5	+ 8 17.4	+0.3269	0.5470	+0.0231	+37	-16
ρ Sagittarii	4	0.56	6.8	18 3.7	11 5 30.2	+ 7 43.8	+0.8738	0.5471	0.0605	+72	+17
v Sagittarii	4½	0.54	6.4	16 10.1	5 34.3	+ 7 47.9	-1.2123	0.5471	0.0605	-58	-90
e Sagittarii	6	0.61	6.2	16 33.2	14 43.3	- 7 20.6	-0.1727	0.5469	0.0738	+13	-45
e Sagittarii	5	-0.62	+ 6.1	-16 23.4	15 35.6	- 6 30.0	-0.2883	0.5470	+0.0751	+ 7	-52
B. A. C. 6746	6	0.62	6.0	15 44.1	16 6.2	- 6 0.4	-0.9714	0.5470	0.0755	-34	-90
g Sagittarii	5½	0.65	5.7	15 47.6	23 4.3	+ 0 44.4	-0.3446	0.5469	0.0853	+ 5	-56
β Capricorni	3	0.70	4.9	15 8.4	12 10 15.2	+11 34.0	-0.0219	0.5464	0.1003	+24	-36
B. A. C. 7063	6	0.72	4.6	15 26.2	15 8.4	- 7 42.1	+0.8104	0.5459	0.1068	+75	+12
B. A. C. 7087	6	-0.73	+ 4.4	-14 6.9	16 40.3	- 6 13.1	-0.4689	0.5459	+0.1091	+ 1	-66
r Capricorni	5½	0.75	4.4	15 32.6	18 11.0	- 4 45.3	+1.2583	0.5459	0.1107	+75	+54
r Capricorni	5	0.75	+ 4.3	15 21.3	19 7.4	- 3 50.6	+1.1577	0.5459	0.1118	+75	+40
NEW MOON.											
B. A. C. 8094	5½	-0.62	- 1.7	- 4 7.3	15 23 45.7	- 1 36.6	+0.4919	0.5442	+0.1762	+66	- 7
11 Piscium	6½	0.58	2.0	2 25.3	16 6 32.4	+ 4 57.4	-0.1152	0.5451	0.1784	+28	-41
13 Piscium	6½	0.56	2.0	1 43.2	7 45.7	+ 6 8.4	-0.6430	0.5451	0.1786	- 1	-81
14 Piscium	6	0.56	2.2	- 1 52.9	8 49.5	+ 7 10.2	-0.2815	0.5450	0.1790	+19	-51
44 Piscium	6	0.40	3.5	+ 1 18.1	17 9 36.3	+ 7 9.7	+0.8194	0.5491	0.1802	+90	+12
B. A. C. 221	6	-0.28	- 3.7	+ 4 41.2	20 29.3	- 6 18.3	-0.7900	0.5518	+0.1777	-10	-86
B. A. C. 274	6½	0.23	4.0	5 51.6	18 1 56.4	- 1 1.9	-1.0517	0.5531	0.1758	-28	-84
73 Piscium	6½	0.21	4.3	5 2.2	4 19.1	+ 1 16.2	+0.2266	0.5538	0.1750	+48	-21
77 Piscium	6	0.22	4.5	4 17.7	4 45.9	+ 1 42.0	+1.0784	0.5540	0.1748	+90	+31
e Piscium	5½	0.21	4.5	5 2.4	5 58.4	+ 2 52.2	+0.5103	0.5543	0.1742	+68	- 5
ζ Piscium	4½	-0.17	- 4.2	+ 6 57.9	8 26.7	+ 5 15.6	-1.0720	0.5554	+0.1728	-30	-83
88 Piscium	6	0.17	4.4	6 23.2	8 54.8	+ 5 42.8	-0.3863	0.5554	0.1728	+13	-57
B. A. C. 410	6	0.13	4.5	6 48.5	12 44.6	+ 9 25.0	-0.1686	0.5567	0.1706	+25	-43
96 Piscium	6½	0.11	4.9	6 41.9	15 35.0	-11 50.3	+0.4304	0.5575	0.1690	+62	- 9
o Piscium	4½	-0.02	4.9	8 34.6	23 5.3	- 4 35.0	-0.2735	0.5602	0.1642	+19	-48
ξ Arietis	5½	+0.16	- 5.9	+10 5.2	19 16 53.8	-11 22.9	+0.9499	0.5672	+0.1485	+90	+25
B. A. C. 755	6	+0.18	- 5.9	+10 2.6	17 45.6	-10 32.8	+1.1233	0.5675	+0.1476	+90	+39

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1860.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
31 Arietis	5½	+0.24	- 5.6	+11 56.9	19 22 6.1	- 6 21.4	-0.2113	0.5698	+0.1433	+23	-42
38 Arietis	5	0.29	6.0	11 57.6	20 1 47.0	- 2 48.3	+0.2951	0.5716	0.1388	+52	-13
Lalande 5725	6	0.40	6.4	12 44.8	11 7.6	+ 6 12.5	+0.7288	0.5754	0.1273	+90	+13
B. A. C. 1119	6	0.60	6.4	16 9.7	21 1 12.4	- 4 13.2	-1.1135	0.5818	0.1073	-36	-74
B. A. C. 1272	6	0.75	7.1	17 1.8	13 10.1	+ 7 18.0	-0.8281	0.5874	0.0881	-14	-73
$\beta$ Tauri	4	+0.83	- 7.6	+17 16.2	19 20.4	-10 45.6	-0.5623	0.5895	+0.0776	+ 3	-50
63 Tauri	6	0.83	7.8	16 30.4	19 33.1	-10 33.3	+0.2303	0.5901	0.0766	+48	-10
$\beta$ Tauri	5½	0.83	7.7	17 10.5	19 49.2	-10 17.9	-0.4285	0.5902	0.0764	+10	-49
$\beta$ Tauri	5	0.85	7.6	17 39.8	20 23.1	- 9 45.3	-0.8823	0.5905	0.0750	-18	-73
70 Tauri	6½	0.83	8.3	15 40.5	20 28.6	- 9 40.1	+1.1447	0.5909	0.0749	+90	+49
75 Tauri	6	+0.86	- 8.2	+16 6.0	21 37.9	- 8 33.3	+0.7989	0.5909	+0.0730	+90	+23
$\theta$ Tauri	4	0.85	8.4	15 42.3	21 41.2	- 8 30.1	+1.2036	0.5911	0.0728	+90	+56
B. A. C. 1391	5	0.87	8.3	15 56.5	22 29.9	- 7 43.3	+1.0224	0.5913	0.0713	+90	+39
$\alpha$ Tauri	1	0.90	8.4	16 16.6	22 0 41.5	- 5 36.6	+0.8339	0.5920	0.0675	+90	+26
B. A. C. 1468	6	0.96	8.0	18 31.4	4 52.5	- 1 35.3	-1.1792	0.5934	0.0598	-44	-72
$\iota$ Tauri	5½	+0.99	- 8.1	+18 38.5	6 56.8	+ 0 24.3	-1.1771	0.5944	+0.0559	-44	-72
B. A. C. 1526	5½	1.00	8.8	16 58.2	9 24.9	+ 2 46.8	+0.6480	0.5947	0.0508	+85	+16
$\pi$ Tauri	5½	1.06	8.6	18 29.3	13 26.0	+ 6 38.6	-0.6996	0.5966	0.0430	- 6	-69
111 Tauri	5½	1.14	9.7	17 16.4	20 17.8	-10 45.5	+0.7793	0.5983	0.0301	+90	+26
115 Tauri	6	1.15	9.5	17 51.6	21 23.8	- 9 42.1	+0.2171	0.5987	0.0273	+48	- 6
117 Tauri	6½	+1.15	- 9.8	+17 8.4	21 45.3	- 9 21.5	+0.9535	0.5987	+0.0268	+90	+38
119 Tauri	5	1.18	9.6	18 30.2	23 24.2	- 7 46.4	-0.3901	0.5991	0.0230	+13	-41
B. A. C. 1728	6	1.17	10.1	16 58.0	23 26.7	- 7 44.0	+1.1706	0.5994	0.0201	+90	+57
120 Tauri	6	1.18	9.6	18 27.3	23 55.9	- 7 15.9	-0.3196	0.5994	0.0199	+16	-36
122 Tauri	6	1.19	10.2	16 58.0	23 1 22.3	- 5 52.8	+1.2120	0.5997	0.0192	+90	+62
127 Tauri	6½	+1.22	- 9.7	+18 55.3	3 40.0	- 3 40.6	-0.7206	0.5999	+0.0146	- 7	-71
130 Tauri	6	1.25	10.2	17 40.9	5 29.9	- 1 55.0	+0.5542	0.6001	+0.0107	+74	+14
71 Orionis	6	1.37	10.6	19 11.4	16 22.2	+ 8 31.8	-0.9672	0.6020	-0.0117	-24	-71
23 Geminorum	6½	1.44	11.9	16 53.3	24 0 48.7	- 7 21.6	+1.1768	0.6025	0.0290	+90	+57
26 Geminorum	5½	1.46	11.9	17 45.2	3 19.4	- 4 56.8	+0.2293	0.6027	0.0336	+48	- 6
51 Geminorum	5½	+1.57	-13.0	+16 21.0	15 38.6	+ 6 53.3	+1.0612	0.6019	-0.0592	+90	+43
$\lambda$ Geminorum	4	1.59	12.8	16 44.7	17 31.1	+ 8 41.4	+0.5514	0.6016	0.0630	+73	+ 9
W. vii. 685	6	1.64	13.1	17 19.7	22 58.3	-10 4.2	-0.4043	0.6011	0.0732	+12	-47
68 Geminorum	5½	1.64	13.4	16 4.2	23 43.0	- 9 21.3	+0.8019	0.6008	0.0748	+90	+23
1 Cancri	6	1.70	13.9	16 5.6	25 9 5.9	- 0 20.3	-0.0050	0.5991	0.0920	+34	-24
5 Cancri	6½	+1.72	-13.7	+16 46.1	10 54.2	+ 1 23.8	-0.8503	0.5985	-0.0954	-15	-74
29 Cancri	6	1.76	14.6	14 35.2	21 56.4	-11 59.4	+0.1772	0.5954	0.1141	+45	-16
A Cancri	6	1.79	15.0	13 5.3	26 3 55.9	- 6 13.5	+0.9681	0.5932	0.1236	+90	+30
$\alpha$ Cancri	4	1.81	15.3	12 17.8	10 14.7	- 0 9.0	+0.9539	0.5912	0.1321	+90	+28
$\xi$ Leonis	5½	1.87	15.3	11 48.2	24 15.3	-10 39.7	-0.5421	0.5856	0.1507	+ 4	-65
$\alpha$ Leonis	5½	+1.87	-15.5	+10 13.1	27 0 16.5	-10 38.5	+1.0505	0.5856	-0.1507	+90	+33
$\sigma$ Leonis	3½	1.87	15.4	10 24.6	4 10.6	- 6 53.1	+0.2604	0.5838	0.1551	+50	-16
B. A. C. 3398	6	1.89	15.4	9 28.3	10 42.2	- 0 35.7	+0.1716	0.5807	0.1620	+44	-22
B. A. C. 3407	6	1.88	15.4	8 51.4	11 25.8	+ 0 6.3	+0.6766	0.5807	0.1628	+86	+ 6
$\pi$ Leonis	5	1.88	15.5	8 35.4	12 20.0	+ 0 58.6	+0.7978	0.5804	0.1631	+90	+13
43 Leonis	6½	+1.90	-15.2	+ 7 7.2	22 13.0	+10 30.4	+0.6316	0.5759	-0.1712	+80	+ 3
48 Leonis	5½	1.90	15.1	7 32.5	28 3 22.9	- 8 30.6	-0.6904	0.5738	0.1750	- 4	-82
35 Sextantis	6½	1.91	14.9	5 20.8	7 9.5	- 4 52.0	+0.8746	0.5728	0.1771	+90	+17
37 Sextantis	6½	1.90	14.8	6 58.5	8 22.0	- 3 42.0	-0.9970	0.5722	0.1775	-24	-83
38 Sextantis	6	1.90	14.8	6 57.0	8 54.6	- 3 10.6	-1.0668	0.5720	0.1778	-29	-83
$\delta$ Leonis	4½	+1.91	-14.4	+ 4 13.9	14 48.7	+ 2 31.2	+0.6442	0.5693	-0.1807	+81	+ 2
75 Leonis	5½	1.92	13.9	2 38.4	22 19.7	+ 9 46.7	+0.9040	0.5667	0.1830	+90	+18
76 Leonis	6½	+1.92	-13.8	+ 2 16.6	23 4.1	+10 29.5	+1.1413	0.5659	-0.1832	+90	+36



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## MARCH.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
79 Leonis	5 $\frac{1}{2}$	+1.91	-13.7	+ 2 2.1	1 1 22.9	-11 16.4	+0.9668	0.5650	-0.1838	+90	+21
7 Leonis	5	1.89	13.7	3 29.1	3 8.6	- 9 34.3	-0.8447	0.5649	0.1840	-13	-87
URANUS				+ 0 2.5	23 58.9	+10 34.1	-1.1452	0.5590	0.1840	-36	-90
$\theta$ Virginis	4 $\frac{1}{2}$	1.80	8.8	- 4 55.6	3 2 35.0	-11 42.0	-0.7278	0.5513	0.1722	- 7	-90
81 Virginis	5 $\frac{1}{2}$	1.76	7.0	7 17.3	15 43.6	+ 1 1.1	-0.4453	0.5488	0.1632	+ 8	-63
$\pi$ Virginis	5 $\frac{1}{2}$	+1.74	- 6.6	- 8 7.5	17 38.7	+ 2 52.5	+0.1308	0.5488	-0.1616	+40	-27
B. A. C. 4591	6	1.74	6.0	9 8.0	20 18.7	+ 5 27.4	+0.7740	0.5487	0.1598	+81	+ 9
W. xiii. 825	6	1.70	5.6	8 59.7	4 0 25.4	+ 9 26.2	-0.0231	0.5476	0.1559	+30	-36
95 Virginis	6	1.65	5.0	8 45.9	5 40.2	- 9 29.1	-1.0752	0.5471	0.1511	-34	-90
96 Virginis	6 $\frac{1}{2}$	1.66	4.7	9 47.5	6 45.3	- 8 26.0	-0.1426	0.5471	0.1502	+23	-43
$\kappa$ Virginis	4 $\frac{1}{2}$	+1.64	- 4.5	- 9 44.5	8 37.2	- 6 37.7	-0.4742	0.5467	-0.1484	+ 5	-65
2 Libræ	6	1.63	- 3.7	11 11.4	13 40.0	- 1 44.6	+0.3415	0.5465	0.1432	+51	-15
$\alpha$ Libræ	6	1.43	+ 0.4	15 8.1	5 17 22.0	+ 1 4.7	+1.0634	0.5449	0.1119	+75	+31
$\alpha$ Libræ	6	1.43	0.4	14 43.4	18 20.6	+ 2 1.5	+0.5075	0.5449	0.1108	+59	- 6
$\gamma$ Libræ	4 $\frac{1}{2}$	1.35	0.8	14 24.3	6 0 22.5	+ 7 51.8	-0.4833	0.5448	0.1023	- 1	-67
$\eta$ Libræ	6	+1.32	+ 1.5	-15 18.4	4 29.5	+11 51.0	+0.0910	0.5448	-0.0970	+30	-29
$\theta$ Libræ	4 $\frac{1}{2}$	1.29	2.3	16 23.5	9 10.1	- 7 37.4	+0.8367	0.5448	0.0911	+74	+14
49 Libræ	6	1.26	2.4	16 11.6	12 21.3	- 4 32.2	+0.3394	0.5448	0.0869	+45	-15
$\phi$ Ophiuchi	5	1.10	3.8	16 21.5	7 3 10.7	+ 9 49.0	-0.6087	0.5449	0.0658	-12	-79
24 Scorpii	5	1.04	4.6	17 31.0	8 10.8	- 9 20.4	+0.3563	0.5450	0.0584	+42	-14
29 Ophiuchi	6	+0.94	+ 5.6	-18 42.7	17 55.7	+ 0 5.9	+1.1768	0.5450	-0.0438	+72	+45
B. A. C. 6060	6	0.62	7.0	18 46.7	8 19 58.4	+ 1 18.7	+0.6345	0.5451	-0.0041	+60	+ 2
6 Sagittarii	6	0.58	6.5	17 8.9	22 39.1	+ 3 54.4	-1.1752	0.5453	+0.0004	-59	-90
B. A. C. 6294	6	0.42	7.4	18 28.8	9 13 7.0	- 6 5.3	+0.4629	0.5451	0.0223	+47	- 8
$\rho$ Sagittarii	4	0.14	7.4	18 3.7	10 13 24.9	- 6 33.8	+0.9931	0.5449	0.0592	+72	+26
$\nu$ Sagittarii	4 $\frac{1}{2}$	+0.14	+ 7.4	-16 10.1	13 29.0	- 6 29.7	-1.0924	0.5449	+0.0594	-46	-90
$\epsilon$ Sagittarii	6	0.04	6.8	16 33.2	22 40.5	+ 2 24.3	-0.0624	0.5448	0.0725	+19	-38
$\epsilon$ Sagittarii	5	0.03	6.7	16 23.4	23 33.1	+ 3 15.2	-0.1799	0.5448	0.0738	+13	-45
B. A. C. 6746	6	+0.03	6.5	15 44.1	11 0 3.7	+ 3 44.8	-0.8624	0.5448	0.0741	-26	-90
$g$ Sagittarii	5 $\frac{1}{2}$	-0.04	6.4	15 47.6	7 3.7	+10 31.5	-0.2437	0.5446	0.0839	+11	-49
$\beta$ Capricorni	3	-0.15	+ 5.8	-15 8.4	18 17.1	- 2 36.4	+0.0694	0.5444	+0.0990	+30	-30
B. A. C. 7063	6	0.20	5.7	15 26.2	23 11.2	+ 2 8.5	+0.8970	0.5441	0.1054	+75	+18
B. A. C. 7087	6	0.20	5.3	14 6.9	12 0 43.4	+ 3 37.8	-0.3864	0.5441	0.1075	+ 5	-59
$\gamma$ Capricorni	5	0.25	5.5	15 21.3	3 10.8	+ 6 4.6	+1.2362	0.5441	0.1103	+75	+50
8 Aquarii	6	0.30	4.6	13 29.6	13 17.1	- 8 12.3	+0.3827	0.5440	0.1225	+51	-13
9 Aquarii	6	-0.31	+ 4.6	-13 58.5	13 52.2	- 7 38.3	+0.9774	0.5440	+0.1233	+76	+24
$\nu$ Aquarii	4 $\frac{1}{2}$	0.33	3.9	11 50.0	18 1.5	- 3 36.8	-0.8277	0.5440	0.1280	-18	-90
B. A. C. 7562	6 $\frac{1}{2}$	0.42	2.4	9 34.0	13 11 18.7	-10 52.3	-0.9008	0.5442	0.1458	-21	-90
$\epsilon$ Capricorni	5	0.42	2.5	9 36.6	11 21.2	-10 49.9	-0.8468	0.5442	0.1458	-17	-90
$\epsilon$ Capricorni	6	0.43	2.5	9 48.3	11 59.5	-10 12.8	-0.5446	0.5442	0.1467	+ 1	-71
B. A. C. 7620	6	-0.46	+ 2.5	-10 51.1	15 32.0	- 6 46.9	+1.1097	0.5446	+0.1503	+80	+34
$\theta$ Aquarii	4 $\frac{1}{2}$	0.48	1.2	8 21.3	14 2 53.0	+ 4 12.6	+0.1823	0.5453	0.1596	+43	-24
$\rho$ Aquarii	5 $\frac{1}{2}$	0.49	+ 1.2	- 8 23.8	4 31.7	+ 5 48.3	+0.4910	0.5454	0.1611	+64	- 7
NEW MOON.											
$\epsilon$ Piscium	5 $\frac{1}{2}$	-0.39	- 5.3	+ 5 2.4	17 12 36.4	+11 17.8	+0.4575	0.5615	+0.1756	+64	- 8
$\zeta$ Piscium	4 $\frac{1}{2}$	0.36	5.2	6 57.9	15 1.6	-10 21.9	-1.1143	0.5620	0.1746	-33	-83
88 Piscium	6	0.37	5.3	6 23.2	15 29.1	- 9 55.3	-0.4328	0.5620	0.1742	+10	-60
B. A. C. 410	6	0.35	5.5	6 48.5	19 14.1	- 6 17.9	-0.2205	0.5632	0.1722	+22	-46
96 Piscium	6 $\frac{1}{2}$	0.33	5.7	6 41.9	22 0.9	- 3 36.7	+0.3699	0.5645	0.1705	+57	-12
$\alpha$ Piscium	4 $\frac{1}{2}$	-0.28	- 6.0	+ 8 34.6	18 5 21.7	+ 3 28.9	-0.3313	0.5674	+0.1654	+16	-52
$\xi$ Arietis	5 $\frac{1}{2}$	0.17	7.0	10 5.2	22 49.3	- 3 40.0	+0.8746	0.5738	0.1496	+90	+20
B. A. C. 755	6	0.17	7.0	10 2.6	23 40.2	- 2 50.9	+1.0452	0.5741	0.1488	+90	+32
31 Arietis	5 $\frac{1}{2}$	0.12	6.9	11 56.9	19 3 56.3	+ 1 16.2	-0.2815	0.5757	0.1442	+19	-46
38 Arietis	5	-0.09	7.1	11 57.6	7 33.3	+ 4 45.5	+0.2216	0.5775	0.1396	+48	-17
Lalande 5725	6	0.00	- 7.6	+12 44.8	16 45.3	-10 22.4	+0.6499	0.5808	+0.1279	+83	+ 8
B. A. C. 1119	6	+0.15	- 7.5	+16 9.7	20 6 40.1	+ 3 1.8	-1.1877	0.5858	+0.1075	-44	-74

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		$d$ $h$ $m$	$h$ $m$					
B. A. C. 1272	6	+0.28	- 8.1	+17 1.8	20 18 32.5	- 9 32.3	-0.9063	0.5898	+0.0879	-19	-73
$\gamma$ Tauri	4	0.31	9.0	15 20.7	23 25.8	- 4 50.1	+1.2173	0.5911	0.0792	+90	+58
$\delta$ Tauri	4	0.33	8.5	17 16.2	21 0 41.2	- 3 37.4	-0.6397	0.5913	0.0772	- 2	-66
63 Tauri	6	0.33	8.7	16 30.4	0 54.1	- 3 25.0	+0.1523	0.5913	0.0770	+44	-14
$\theta$ Tauri	5.4	0.34	8.6	17 10.5	1 10.1	- 3 9.7	-0.5060	0.5915	0.0767	+ 6	-54
$\phi$ Tauri	5	+0.35	- 8.4	+17 39.8	1 43.9	- 2 37.1	-0.9596	0.5919	+0.0753	-23	-73
70 Tauri	6.4	0.33	9.1	15 40.4	1 49.3	- 2 32.0	+1.0681	0.5919	0.0753	+90	+42
75 Tauri	6	0.36	9.0	16 5.9	2 58.6	- 1 25.3	+0.7209	0.5919	0.0733	+90	+18
$\theta$ Tauri	4	0.35	9.1	15 42.2	3 1.9	- 1 22.1	+1.1254	0.5919	0.0733	+90	+48
$\phi$ Tauri	4	0.35	9.1	15 36.7	3 4.3	- 1 19.8	+1.2218	0.5919	0.0733	+90	+59
B. A. C. 1391	5	+0.36	- 9.0	+15 56.5	3 50.4	- 0 35.4	+0.9426	0.5923	+0.0716	+90	+33
$\alpha$ Tauri	1	0.40	9.1	16 16.5	6 1.9	+ 1 31.1	+0.7577	0.5928	0.0678	+90	+21
B. A. C. 1526	5.4	0.49	9.4	16 58.1	14 45.9	+ 9 55.2	+0.5712	0.5932	0.0510	+75	+11
$\mu$ Tauri	5.4	0.54	9.1	18 29.2	18 47.8	-10 12.3	-0.7771	0.5953	0.0423	-11	-72
111 Tauri	5.4	0.62	10.1	17 16.4	29 1 42.0	- 3 34.0	+0.7058	0.5964	0.0296	+90	+21
115 Tauri	6	+0.63	- 9.8	+17 51.6	2 48.6	- 2 30.0	+0.1418	0.5965	+0.0275	+43	-10
117 Tauri	6.4	0.63	10.1	17 8.4	3 10.3	- 2 9.1	+0.8814	0.5965	0.0272	+90	+33
119 Tauri	5	0.66	9.8	18 30.2	4 50.1	- 0 33.2	-0.4558	0.5965	0.0235	+ 8	-46
B. A. C. 1728	6	0.65	10.3	16 58.0	4 52.6	- 0 30.8	+1.1008	0.5965	0.0235	+90	+50
120 Tauri	6	0.66	9.8	18 27.3	5 22.1	- 0 2.4	-0.3951	0.5965	0.0228	+12	-42
122 Tauri	6	+0.67	-10.3	+16 58.0	6 49.2	+ 1 21.4	+1.1429	0.5967	+0.0196	+90	+54
127 Tauri	6.4	0.71	9.8	18 55.3	9 8.3	+ 3 35.0	-0.7986	0.5969	0.0152	-12	-71
130 Tauri	6	0.73	10.3	17 40.9	10 59.3	+ 5 21.8	+0.4828	0.5969	+0.0113	+67	+10
71 Orionis	6	0.87	10.4	19 11.4	22 0.5	- 8 2.5	-1.0447	0.5973	-0.0110	-31	-71
23 Geminorum	6.4	0.95	11.7	16 53.3	23 6 35.5	+ 0 12.6	+1.1174	0.5966	0.0285	+90	+51
26 Geminorum	5.4	+0.96	-11.5	+17 45.2	9 9.0	+ 2 40.2	+0.1620	0.5965	-0.0331	+44	- 9
51 Geminorum	5.4	1.11	12.3	16 21.0	21 43.9	- 9 13.9	+1.0079	0.5944	0.0593	+90	+39
$\lambda$ Geminorum	4	1.14	12.3	16 44.7	23 39.1	- 7 23.1	+0.4946	0.5942	0.0616	+68	+ 6
W. vii. 685	6	1.20	12.4	17 19.7	24 5 14.4	- 2 0.6	-0.4696	0.5930	0.0716	+ 8	-51
68 Geminorum	5.4	1.21	12.8	16 4.2	6 0.2	- 1 16.6	+0.7501	0.5926	0.0731	+90	+20
1 Cancri	6	+1.31	-13.1	+16 5.6	15 37.6	+ 7 59.0	-0.0609	0.5902	-0.0904	+31	-27
5 Cancri	6.4	1.34	13.0	16 46.1	17 28.9	+ 9 46.1	-0.9179	0.5893	0.0938	-20	-74
29 Cancri	6	1.44	13.8	14 35.2	25 4 49.6	- 3 18.6	+0.1286	0.5861	0.1118	+42	-19
A <sup>1</sup> Cancri	6	1.48	14.4	13 5.3	10 59.5	+ 2 37.6	+0.9333	0.5843	0.1212	+90	+27
$\alpha$ Cancri	4	1.54	14.7	12 17.9	17 29.3	+ 8 53.2	+0.9206	0.5817	0.1305	+90	+25
$\xi$ Leonis	5.4	+1.66	-14.8	+11 48.3	26 7 54.1	- 1 13.2	-0.5864	0.5767	-0.1480	+ 2	-69
$\delta$ Leonis	5.4	1.66	15.3	10 13.1	7 55.4	- 1 11.9	+1.0283	0.5767	0.1480	+90	+31
$\theta$ Leonis	3.4	1.69	15.1	10 24.6	11 56.1	+ 2 40.2	+0.2313	0.5751	0.1524	+48	-18
B. A. C. 3398	6	1.74	15.2	9 28.3	18 38.4	+ 9 8.3	+0.1448	0.5729	0.1591	+43	-23
B. A. C. 3407	6	1.75	15.3	8 51.4	19 23.2	+ 9 51.5	+0.6543	0.5725	0.1599	+83	+ 5
$\pi$ Leonis	5	+1.75	-15.4	+ 8 35.4	20 18.9	+10 45.3	+0.7787	0.5723	-0.1603	+90	+12
43 Leonis	6.4	1.82	15.3	7 7.2	27 6 27.2	- 3 27.6	+0.6132	0.5701	0.1688	+78	+ 1
48 Leonis	5.4	1.86	15.1	7 32.5	11 44.6	+ 1 38.9	-0.7201	0.5671	0.1723	- 6	-83
35 Sextantis	6.4	1.88	15.2	5 20.7	15 36.2	+ 5 22.5	+0.8648	0.5657	0.1745	+90	+16
37 Sextantis	6.4	1.87	14.9	6 58.5	16 50.3	+ 6 34.1	-1.0245	0.5653	0.1751	-26	-83
38 Sextantis	6	+1.87	-14.9	+ 6 57.0	17 23.7	+ 7 6.3	-1.0965	0.5650	-0.1756	-32	-83
$\delta$ Leonis	4.4	1.92	15.1	4 13.8	23 25.2	-11 4.5	+0.6352	0.5635	0.1783	+80	+ 2
75 Leonis	5.4	1.96	14.9	2 38.4	28 7 5.0	- 3 40.1	+0.9001	0.5614	0.1809	+90	+18
76 Leonis	6.4	1.97	14.8	2 16.6	7 50.2	- 2 56.5	+1.1395	0.5610	0.1811	+90	+36
79 Leonis	5.4	1.98	14.7	2 2.1	10 11.5	- 0 39.9	+0.9647	0.5607	0.1816	+90	+22
$\tau$ Leonis	5	+1.96	-14.5	+ 3 29.1	11 58.9	+ 1 3.9	-0.8604	0.5603	-0.1820	-14	-87
URANUS				+ 0 30.3	29 7 5.5	- 4 27.5	-1.2709	0.5578	0.1831	-51	-79
$\theta$ Virginis	4.4	2.14	10.6	- 4 55.7	30 11 49.8	- 0 39.2	-0.7186	0.5517	0.1722	- 7	-90
81 Virginis	5.4	2.16	9.0	7 17.3	31 0 57.4	-11 57.1	-0.4329	0.5508	0.1637	+ 9	-62
$\mu$ Virginis	5.4	2.16	8.8	8 7.5	2 52.3	-10 5.9	+0.1415	0.5507	0.1620	+40	-26
B. A. C. 4591	6	+2.16	- 8.4	- 9 8.0	5 31.6	- 7 31.8	+0.7863	0.5504	-0.1597	+81	+10
W. xiii. 825	6	+2.16	- 7.9	- 8 59.7	9 37.2	- 3 34.1	-0.0089	0.5504	-0.1565	+31	-35

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

### MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1855.0.		Apparent Destination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
95 Virginis	6	+2.14	-7.3	- 8 45.9	31 14 50.2	+ 1 28.9	-1.0600	0.5500	-0.1519	-32	-90
96 Virginis	6½	2.15	7.0	9 47.5	15 54.9	+ 2 31.6	-0.1263	0.5500	0.1509	+24	-42
$\kappa$ Virginis	4½	2.14	6.8	9 44.5	17 45.9	+ 4 19.0	-0.4577	0.5500	0.1490	+ 6	-64
2 Libræ	6	+2.14	-6.1	-11 11.4	22 46.5	+ 9 9.9	+0.3570	0.5499	-0.1442	+52	-15

### APRIL.

♈ Libræ	6	+2.07	-1.9	-15 8.1	2 2 12.5	+11 43.1	-1.0782	0.5494	-0.1127	+75	+32
♈ Libræ	6	2.06	1.8	14 43.4	3 10.4	-11 20.9	+0.5240	0.5494	0.1115	+60	- 5
$\gamma$ Libræ	4½	2.03	1.2	14 24.3	9 8.3	- 5 34.5	-0.4636	0.5494	0.1038	+ 1	-65
$\eta$ Libræ	6	+2.01	-0.5	-15 18.4	13 12.6	- 1 38.0	+0.1070	0.5492	-0.0985	+32	-28
$\theta$ Libræ	4½	2.01	+0.4	16 23.5	17 49.9	+ 2 50.4	+0.8521	0.5490	0.0916	+74	+15
49 Libræ	6	1.96	0.7	16 11.6	20 58.9	+ 5 53.3	+0.3529	0.5489	0.0873	+45	-14
♏ Ophiuchi	5	1.85	2.3	16 21.6	3 11 38.9	- 3 55.0	-0.5883	0.5487	0.0660	-10	-77
24 Scorpii	5	1.80	3.2	17 31.0	16 36.0	+ 0 52.5	+0.3696	0.5486	0.0586	+44	-13
29 Ophiuchi	6	+1.73	+4.6	-18 42.7	4 2 15.8	+10 13.7	+1.1885	0.5480	-0.0444	+72	+46
B. A. C. 6060	6	1.45	7.0	18 46.7	5 4 9.1	+11 17.2	+0.6430	0.5465	-0.0042	+61	+ 3
6 Sagittarii	6	1.40	6.5	17 8.9	6 49.3	-10 7.6	-1.1647	0.5462	+0.0002	-58	-90
B. A. C. 6294	6	1.23	8.0	18 28.8	21 15.8	+ 3 51.2	+0.4702	0.5451	0.0220	+47	- 8
♐ Sagittarii	4	0.95	8.7	18 3.7	6 21 37.5	+ 3 26.6	+0.9963	0.5430	0.0588	+72	+26
♐ Sagittarii	4½	+0.93	+8.1	-16 10.1	21 41.5	+ 3 30.4	-1.0904	0.5430	+0.0588	-45	-90
♐ Sagittarii	6	0.83	8.4	16 33.2	7 6 56.2	-11 32.2	-0.0607	0.5423	0.0719	+19	-38
♐ Sagittarii	5	0.81	8.2	16 23.4	7 49.1	-10 41.1	-0.1783	0.5421	0.0732	+13	-45
B. A. C. 6746	6	0.81	8.0	15 44.1	8 19.9	-10 11.2	-0.8624	0.5421	0.0732	-26	-90
♐ Sagittarii	5½	0.72	8.1	15 47.6	15 22.8	- 3 21.5	-0.2423	0.5413	0.0839	+11	-49
♑ Capricorni	3	+0.58	+7.9	-15 8.4	8 2 42.1	+ 7 36.4	+0.0677	0.5408	+0.0985	+29	-31
B. A. C. 7063	6	0.52	8.0	15 26.2	7 38.8	-11 36.1	+0.8976	0.5405	0.1050	+75	+18
B. A. C. 7087	6	0.51	7.5	14 6.9	9 12.0	-10 5.8	-0.3892	0.5404	0.1064	+ 5	-59
♑ Capricorni	5	0.48	7.9	15 21.3	11 40.8	- 7 41.7	+1.2382	0.5404	0.1097	+75	+51
8 Aquarii	6	0.36	7.1	13 29.6	21 53.0	+ 2 11.4	+0.3802	0.5402	0.1217	+51	-13
9 Aquarii	6	+0.36	+7.3	-13 58.5	22 28.6	+ 2 45.9	+0.9858	0.5400	+0.1226	+76	+24
♑ Aquarii	4½	0.31	6.4	11 50.0	9 2 40.4	+ 6 50.0	-0.8335	0.5401	0.1273	-19	-90
B. A. C. 7562	6½	0.16	5.0	9 33.9	20 7.7	- 0 15.3	-0.9101	0.5405	0.1449	-22	-90
♑ Capricorni	5	0.16	5.1	9 36.5	20 10.2	- 0 12.9	-0.8559	0.5405	0.1449	-18	-90
♑ Capricorni	6	0.14	5.0	9 48.2	20 48.8	+ 0 24.5	-0.5513	0.5405	0.1458	0	-72
B. A. C. 7620	6	+0.10	+5.1	-10 51.0	10 0 23.3	+ 3 52.2	+1.1043	0.5411	+0.1491	+79	+33
♑ Aquarii	4½	0.02	3.8	8 21.2	11 49.8	- 9 2.7	+0.1753	0.5421	0.1587	+42	-25
♑ Aquarii	5½	+0.01	3.7	8 23.7	13 29.2	- 7 26.3	+0.4825	0.5421	0.1602	+63	- 8
Lalande 43974	6	-0.03	3.0	7 8.2	18 55.5	- 2 10.3	+0.0160	0.5430	0.1640	+34	-34
B. A. C. 8094	5½	0.16	+0.9	4 7.3	11 16 28.6	- 5 18.0	+0.4827	0.5471	0.1763	+65	- 8
11 Piscium	6½	-0.19	0.0	- 2 25.3	23 9.4	+ 1 10.0	-0.1246	0.5486	+0.1786	+27	-42
13 Piscium	6½	0.19	-0.2	1 43.2	19 0 21.5	+ 2 19.7	-0.6480	0.5489	0.1790	- 2	-81
14 Piscium	6	0.20	0.3	- 1 52.9	1 24.0	+ 3 20.3	-0.2910	0.5495	0.1795	+18	-52
Venus				+ 6 34.1	14 2 59.8	+ 3 17.3	-0.1044	0.5202	0.1542	+28	-38
NEW MOON.											
B. A. C. 1119	6	-0.13	-8.4	+16 9.7	16 13 51.5	-11 59.1	-1.1400	0.5046	+0.1098	-38	-74
B. A. C. 1272	6	0.06	8.8	17 1.8	17 1 24.6	- 0 52.6	-0.8570	0.5987	0.0596	-16	-73
$\gamma$ Tauri	4	0.03	9.6	15 20.7	6 10.3	+ 3 42.0	+1.2417	0.5997	0.0813	+90	+61
♉ Tauri	4	0.02	9.2	17 16.1	7 23.6	+ 4 52.5	-0.5906	0.6003	0.0785	+ 1	-62
63 Tauri	6	-0.02	-9.3	+16 30.3	7 36.1	+ 5 4.5	+0.1924	0.6003	+0.0783	+46	-12
♉ Tauri	5½	0.02	9.2	17 10.4	7 51.7	+ 5 19.4	-0.4584	0.6003	0.0780	+ 8	-51
♉ Tauri	5	0.00	9.2	17 39.7	8 24.6	+ 5 51.1	-0.9070	0.6004	0.0766	-19	-73
70 Tauri	6½	0.02	9.7	15 40.4	8 29.9	+ 5 56.1	+1.0960	0.6005	0.0766	+90	+45
75 Tauri	6	0.00	9.6	16 5.9	9 37.3	+ 7 0.9	+0.7346	0.6009	0.0762	+90	+20
♉ Tauri	4	-0.01	-9.7	+15 42.2	9 40.5	+ 7 4.0	+1.1543	0.6009	+0.0744	+90	+51
B. A. C. 1391	5	-0.01	-9.7	+15 56.4	10 27.9	+ 7 49.6	+0.9752	0.6009	+0.0728	+90	+35

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$y'$	N.	S.	
		$\Delta\alpha$	$\Delta\delta$									
$\alpha$ Tauri	1	+0.02	- 9.8	+16° 16.5	17 12 35.9	+ 9 52.6	+0.7911	0.6012	+0.0687	+90°	+23	
B. A. C. 1526	5 $\frac{1}{2}$	0.09	9.9	16 58.1	21 6.8	- 5 56.5	+0.6120	0.6027	0.0523	+80	+14	
$m$ Tauri	5 $\frac{1}{2}$	0.12	9.8	18 20.2	18 1 3.0	- 2 9.6	-0.7223	0.6032	0.0445	- 7	-72	
111 Tauri	5 $\frac{1}{2}$	0.19	10.5	17 16.4	7 47.7	+ 4 19.2	+0.7475	0.6035	0.0304	+90	+24	
115 Tauri	6	0.20	10.3	17 51.6	8 52.8	+ 5 21.7	+0.1906	0.6035	0.0283	+46	- 7	
117 Tauri	6 $\frac{1}{2}$	+0.19	-10.6	+17 8.4	9 14.2	+ 5 42.3	+0.9230	0.6035	+0.0278	+90	+36	
119 Tauri	5	0.22	10.3	18 30.2	10 51.7	+ 7 15.9	-0.4031	0.6035	0.0241	+11	-42	
B. A. C. 1728	6	0.21	10.7	16 58.0	10 54.1	+ 7 18.2	+1.1405	0.6035	0.0241	+90	+54	
120 Tauri	6	0.23	10.3	18 27.3	11 22.9	+ 7 45.9	-0.3429	0.6034	0.0227	+15	-38	
122 Tauri	6	0.23	10.7	16 58.0	12 48.3	+ 9 7.9	+1.1825	0.6033	0.0201	+90	+59	
127 Tauri	6 $\frac{1}{2}$	+0.26	-10.3	+18 55.3	15 4.6	+11 18.9	-0.7394	0.6033	+0.0156	- 8	-71	
130 Tauri	6	0.27	10.6	17 40.9	16 53.4	-10 56.6	+0.5286	0.6033	+0.0115	+71	+13	
71 Orionis	6	0.39	10.4	19 11.4	19 3 42.6	- 0 33.0	-0.9815	0.6023	-0.0111	-26	-71	
23 Geminorum	6 $\frac{1}{2}$	0.46	11.5	16 53.3	12 10.1	+ 7 34.5	+1.1673	0.6007	0.0280	+90	+56	
26 Geminorum	5 $\frac{1}{2}$	0.49	11.3	17 45.2	14 41.6	+10 0.2	+0.2182	0.6003	0.0337	+48	- 6	
51 Geminorum	5 $\frac{1}{2}$	+0.62	-12.0	+16 21.0	20 3 9.1	- 2 1.4	+1.0649	0.5966	-0.0577	+90	+44	
$\lambda$ Geminorum	4	0.65	11.9	16 44.7	5 3.5	- 0 11.4	+0.5537	0.5961	0.0614	+73	+ 9	
W. vii. 685	6	0.72	12.0	17 19.7	10 36.7	+ 5 9.0	-0.4061	0.5940	0.0721	+11	-47	
68 Geminorum	5 $\frac{1}{2}$	0.72	12.5	16 4.2	11 22.3	+ 5 52.8	+0.8091	0.5938	0.0737	+90	+24	
1 Cancri	6	0.83	12.4	16 5.6	20 58.5	- 8 52.8	+0.0017	0.5898	0.0902	+34	-24	
5 Cancri	6 $\frac{1}{2}$	+0.85	-12.1	+16 46.1	22 49.8	- 7 5.7	-0.8533	0.5891	-0.0935	-15	-74	
29 Cancri	6	0.97	12.7	14 35.2	21 10 12.2	+ 3 51.4	+0.1932	0.5844	0.1113	+46	-15	
$\alpha$ Cancri	6	1.04	13.3	13 5.3	16 24.1	+ 9 49.6	+1.0002	0.5812	0.1209	+90	+32	
$\alpha$ Cancri	4	1.13	13.5	12 17.9	22 57.2	- 7 51.5	+0.9868	0.5785	0.1296	+90	+30	
$\xi$ Leonis	5 $\frac{1}{2}$	1.28	13.5	11 48.3	22 13 32.0	+ 6 12.1	-0.5296	0.5714	0.1471	+ 5	-64	
$\lambda$ Leonis	5 $\frac{1}{2}$	+1.29	-14.0	+10 13.2	13 33.3	+ 6 13.4	+1.0932	0.5714	-0.1471	+90	+36	
$\sigma$ Leonis	3 $\frac{1}{2}$	1.31	13.8	10 24.7	17 37.4	+10 8.9	+0.2890	0.5698	0.1514	+52	-15	
B. A. C. 3398	6	1.39	13.9	9 28.4	23 0 26.1	- 7 16.6	+0.2005	0.5669	0.1579	+46	-20	
B. A. C. 3407	6	1.40	14.0	8 51.5	1 2.8	- 6 41.5	+0.7374	0.5669	0.1583	+90	+10	
$\pi$ Leonis	5	1.41	14.0	8 35.5	2 8.3	- 5 37.9	+0.8405	0.5665	0.1592	+90	+16	
43 Leonis	6 $\frac{1}{2}$	+1.52	-14.2	+ 7 7.3	12 27.5	+ 4 20.2	+0.6712	0.5623	-0.1673	+85	+ 5	
48 Leonis	5 $\frac{1}{2}$	1.58	13.8	7 32.6	17 51.1	+ 9 32.9	-0.6759	0.5606	0.1707	- 3	-81	
35 Sextantis	6 $\frac{1}{2}$	1.61	14.2	5 20.8	21 47.3	-10 38.9	+0.9220	0.5591	0.1728	+90	+20	
37 Sextantis	6 $\frac{1}{2}$	1.62	13.7	6 58.5	23 2.9	- 9 25.8	-0.9828	0.5589	0.1734	-23	-83	
38 Sextantis	6	1.63	13.7	6 57.0	23 37.1	- 8 52.8	-1.0556	0.5586	0.1740	-28	-83	
$\delta$ Leonis	4 $\frac{1}{2}$	+1.69	-14.1	+ 4 13.9	24 5 46.1	- 2 56.0	+0.6871	0.5565	-0.1765	+86	+ 4	
75 Leonis	5 $\frac{1}{2}$	1.78	14.0	2 38.4	13 35.3	+ 4 37.7	+0.9513	0.5543	0.1794	+90	+21	
76 Leonis	6 $\frac{1}{2}$	1.78	14.1	2 16.6	14 21.7	+ 5 22.5	+1.1929	0.5542	0.1794	+90	+41	
79 Leonis	5 $\frac{1}{2}$	1.81	13.9	2 2.1	16 45.8	+ 7 41.9	+1.0132	0.5538	0.1801	+90	+25	
$\tau$ Leonis	5	1.81	13.5	+ 3 29.1	18 35.5	+ 9 28.0	-0.8297	0.5538	0.1805	-12	-87	
$\theta$ Virginis	4 $\frac{1}{2}$	+2.22	-10.7	- 4 55.7	26 19 21.7	+ 8 40.3	-0.7186	0.5475	-0.1719	- 7	-90	
81 Virginis	5 $\frac{1}{2}$	2.31	9.4	7 17.4	27 8 40.2	- 2 26.6	-0.4411	0.5475	0.1635	+ 8	-62	
$m$ Virginis	5 $\frac{1}{2}$	2.34	9.3	8 7.6	10 36.4	- 0 34.1	+0.1353	0.5475	0.1619	+40	-27	
B. A. C. 4591	6	2.36	9.0	9 8.0	13 17.8	+ 2 2.1	+0.7784	0.5475	0.1602	+81	+ 9	
W. xiii. 825	6	2.38	8.4	8 59.7	17 26.1	+ 6 2.5	-0.0232	0.5476	0.1565	+30	-36	
95 Virginis	6	+2.37	- 7.6	- 8 45.9	22 42.1	+11 8.5	-1.0849	0.5477	-0.1522	-34	-90	
96 Virginis	6 $\frac{1}{2}$	2.40	7.6	9 47.5	23 47.4	-11 48.2	-0.1485	0.5480	0.1511	+23	-43	
$\kappa$ Virginis	4 $\frac{1}{2}$	2.39	7.4	9 44.5	28 1 39.5	- 9 59.7	-0.4832	0.5480	0.1494	+ 4	-66	
2 Libræ	6	2.43	6.8	11 11.4	6 42.4	- 5 6.5	+0.3317	0.5483	0.1447	+50	-16	
$\sigma$ Libræ	6	2.52	2.8	15 8.1	29 10 15.1	- 2 26.6	+1.0261	0.5499	0.1139	+75	+28	
$\sigma$ Libræ	6	+2.51	- 2.8	-14 43.4	11 13.1	- 1 30.5	+0.4707	0.5499	-0.1126	+56	- 8	
$\gamma$ Libræ	4 $\frac{1}{2}$	2.49	1.9	14 24.3	17 11.2	+ 4 16.2	-0.5242	0.5502	0.1050	- 3	-70	
$\eta$ Libræ	6	2.50	1.2	15 18.4	21 15.4	+ 8 12.4	+0.0454	0.5503	0.0993	+28	-32	
$\theta$ Libræ	4 $\frac{1}{2}$	2.50	- 0.4	16 23.5	30 1 52.3	-11 19.5	+0.7859	0.5507	0.0928	+74	+11	
49 Libræ	6	2.50	+ 0.1	16 11.6	5 1.0	- 8 16.8	+0.2859	0.5507	0.0885	+41	-18	
$\phi$ Ophiuchi	5	+2.43	+ 2.1	-16 21.6	19 38.4	+ 5 52.3	-0.6730	0.5511	-0.0669	-15	-88	

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$y'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
24 Scorpi	5	+2.44	+2.9	-17° 31.1	1 0 34.3	+10 38.5	+0.2856	0.5507	-0.0595	+38	-18
29 Ophiuchi	6	2.40	4.5	18 42.7	10 11.6	- 4 2.8	+1.0955	0.5507	0.0453	+72	+35
B. A. C. 6060	6	2.20	7.5	18 46.7	2 11 58.0	- 3 6.1	+0.5309	0.5488	-0.0060	+50	- 4
B. A. C. 6294	6	2.03	9.2	18 28.7	3 5 1.6	-10 35.2	+0.3453	0.5466	+0.0216	+38	-15
$\rho^1$ Sagittarii	4	1.76	10.9	18 3.6	4 5 23.2	-11 0.0	+0.8622	0.5425	0.0585	+72	+16
$\epsilon^1$ Sagittarii	6	+1.64	+10.8	-16 33.1	14 43.6	- 1 57.2	-0.2029	0.5411	+0.0716	+11	-47
$\epsilon^2$ Sagittarii	5	1.63	10.8	16 23.3	15 36.7	- 1 5.8	-0.3209	0.5410	0.0729	+ 5	-55
B. A. C. 6746	6	1.62	10.6	15 44.0	16 7.7	- 0 35.7	-1.0069	0.5410	0.0732	-37	-90
$\gamma$ Sagittarii	5.5	1.53	10.9	15 47.5	23 12.9	+ 6 16.2	-0.3871	0.5401	0.0828	+ 3	-59
$\beta$ Capricorni	3	1.39	11.0	15 8.3	5 10 36.8	- 6 41.1	-0.0773	0.5384	0.0981	+21	-39
B. A. C. 7063	6	+1.33	+11.1	-15 26.1	15 36.3	- 1 50.9	+0.7531	0.5376	+0.1041	+75	+ 9
B. A. C. 7087	6	1.31	10.8	14 6.8	17 10.3	- 0 19.7	-0.5380	0.5375	0.1058	- 3	-72
$\tau^1$ Capricorni	5.5	1.20	11.3	15 32.5	18 42.9	+ 1 10.0	+1.1987	0.5372	0.1079	+75	+45
$\tau^2$ Capricorni	5	1.28	11.2	15 21.2	19 40.6	+ 2 5.9	+1.0975	0.5371	0.1091	+75	+34
8 Aquarii	6	1.16	10.6	13 29.5	6 5 59.8	-11 54.0	+0.2342	0.5363	0.1208	+42	-21
9 Aquarii	6	+1.14	+10.8	-13 58.4	6 35.8	-11 19.1	+0.8360	0.5362	+0.1216	+76	+14
$\nu$ Aquarii	4.5	1.10	10.1	11 49.9	10 50.8	- 7 11.9	-0.9863	0.5359	0.1262	-29	-90
B. A. C. 7562	6.5	0.90	8.9	9 33.9	7 4 33.5	+ 9 58.3	-1.0600	0.5356	0.1441	-33	-90
$\epsilon^1$ Capricorni	5	0.89	8.9	9 36.5	4 36.1	+10 0.8	-1.0072	0.5356	0.1441	-28	-90
$\epsilon^2$ Capricorni	6	0.88	8.9	9 48.2	5 15.5	+10 39.0	-0.7001	0.5354	0.1444	- 8	-90
B. A. C. 7620	6	+0.83	+ 9.1	-10 50.9	8 53.3	- 9 49.9	+0.9672	0.5354	+0.1478	+79	+22
$\theta$ Aquarii	4.5	0.74	7.9	8 21.2	20 31.5	+ 1 26.9	+0.0378	0.5362	0.1577	+34	-32
$\rho$ Aquarii	5.5	0.71	7.8	8 23.7	22 12.8	+ 3 5.1	+0.3510	0.5362	0.1585	+54	-15
Lalande 43974	6	0.65	7.0	7 8.2	8 3 44.8	+ 8 26.9	-0.1184	0.5370	0.1626	+26	-41
B. A. C. 8094	5.5	0.45	4.7	4 7.2	9 1 40.6	+ 5 41.9	+0.3651	0.5413	0.1751	+56	-14
11 Piscium	6.5	+0.40	+ 3.8	- 2 25.2	8 28.0	-11 43.5	-0.2418	0.5430	+0.1777	+21	-49
13 Piscium	6.5	0.40	3.5	1 43.1	9 41.3	-10 32.5	-0.7672	0.5436	0.1781	- 9	-90
14 Piscium	6	0.38	3.4	- 1 52.8	10 44.9	- 9 30.8	-0.4071	0.5436	0.1785	+12	-60
44 Piscium	6	0.20	+ 0.6	+ 1 18.2	10 11 17.0	- 9 46.0	+0.6923	0.5527	0.1820	+87	+ 4
B. A. C. 221	6	0.15	- 1.1	4 41.3	21 55.7	+ 0 31.6	-0.8878	0.5582	0.1806	-16	-86
B. A. C. 274	6.5	+0.12	- 1.9	+ 5 51.7	11 3 13.8	+ 5 39.0	-1.1421	0.5607	+0.1793	-35	-84
73 Piscium	6.5	0.10	1.8	5 2.3	5 32.2	+ 7 52.8	+0.1200	0.5625	0.1784	+41	-27
77 Piscium	6	0.09	1.6	4 17.8	5 58.3	+ 8 17.9	+0.9603	0.5626	0.1783	+90	+22
$\epsilon$ Piscium	5.5	0.08	1.9	5 2.5	7 8.5	+ 9 25.8	+0.4026	0.5629	0.1778	+60	-12
$\zeta$ Piscium	4.5	0.09	*2.6	6 58.0	9 32.0	+11 44.4	-1.1516	0.5644	0.1769	-37	-83
88 Piscium	6	+0.09	- 2.4	+ 6 23.3	9 59.2	-11 49.3	-0.4773	0.5645	+0.1767	+ 8	-64
B. A. C. 410	6	0.07	2.7	6 48.6	13 41.1	- 8 15.0	-0.2577	0.5669	0.1750	+20	-48
96 Piscium	6.5	0.05	3.0	6 41.9	16 25.2	- 5 36.7	+0.3322	0.5686	0.1734	+55	-15
$\sigma$ Piscium	4.5	+0.04	3.9	8 34.6	23 37.9	+ 1 21.0	-0.3477	0.5725	0.1689	+15	-53
MERCURY				9 42.9	12 10 59.0	-11 42.1	+0.3640	0.5751	0.1650	+57	-12
NEW MOON.											
$\alpha$ Tauri	1	-0.05	- 9.5	+16 16.5	14 21 25.3	- 3 30.0	+0.8537	0.6101	+0.0710	+90	+27
$m$ Tauri	5.5	-0.02	9.9	18 29.2	15 9 31.4	+ 8 6.6	-0.6233	0.6127	0.0462	- 1	-62
111 Tauri	5.5	0.00	10.4	17 16.4	16 4.1	- 9 36.6	+0.8362	0.6137	0.0325	+90	+29
115 Tauri	6	+0.01	-10.3	+17 51.6	17 7.2	- 8 36.1	+0.2886	0.6137	+0.0304	+53	- 2
117 Tauri	6.5	0.00	10.4	17 8.4	17 27.6	- 8 16.6	+1.0109	0.6137	0.0290	+90	+42
119 Tauri	5	0.02	10.3	18 30.2	19 2.3	- 6 45.7	-0.9936	0.6138	0.0261	+18	-35
B. A. C. 1728	6	0.01	10.5	16 58.0	19 4.7	- 6 43.4	+1.2269	0.6138	0.0261	+90	+64
120 Tauri	6	0.02	10.3	18 27.3	19 32.6	- 6 16.6	-0.2342	0.6138	0.0244	+21	-31
127 Tauri	6.5	+0.05	-10.4	+18 55.3	23 7.4	- 2 50.6	-0.6200	0.6138	+0.0172	- 1	-59
130 Tauri	6	0.05	10.6	17 40.9	16 0 52.8	- 1 9.4	+0.6335	0.6138	+0.0132	+83	+19
71 Orionis	6	0.12	10.6	19 11.4	11 21.4	+ 8 53.5	-0.8437	0.6130	-0.0094	-15	-71
26 Geminorum	5.5	0.19	10.9	17 45.2	21 59.3	- 4 54.4	+0.3522	0.6103	0.0327	+57	+ 1
51 Geminorum	5.5	0.26	11.4	16 21.0	17 10 3.5	+ 6 40.6	+1.1992	0.6063	0.0577	+90	+57
$\lambda$ Geminorum	4	+0.30	-11.3	+16 44.7	11 54.4	+ 8 27.1	+0.6955	0.6056	-0.0616	+90	+18
W. vir. 685	6	+0.35	-11.3	+17 19.7	17 17.8	-10 22.3	-0.2460	0.6032	-0.0720	+21	-36

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
68 Geminorum	5 $\frac{1}{2}$	+0.35	-11.6	+16 4.2	17 18 2.2	- 9 39.7	+0.9546	0.6028	-0.0735	+90	+34
f Geminorum	6	0.37	10.9	17 55.9	20 19.9	- 7 27.3	-1.0767	0.6019	0.0777	-33	-72
1 Cancri	6	0.44	11.5	16 5.6	18 3 21.9	- 0 41.9	+0.1651	0.5980	0.0912	+44	-15
5 Cancri	6 $\frac{1}{2}$	0.46	11.1	16 46.1	5 10.4	+ 1 2.4	-0.6778	0.5973	0.0940	- 4	-70
29 Cancri	6	0.58	11.7	14 35.2	16 15.7	+11 42.3	+0.3636	0.5911	0.1123	+57	- 6
A1 Cancri	6	+0.64	-12.1	+13 5.3	22 19.4	- 6 27.7	+1.1660	0.5876	-0.1213	+90	+47
a Cancri	4	0.73	12.2	12 17.9	19 4 44.3	- 0 17.0	+1.1577	0.5836	0.1306	+90	+45
$\xi$ Leonis	5 $\frac{1}{2}$	0.89	11.9	11 48.3	19 4.5	-10 28.0	-0.3408	0.5753	0.1479	+16	-50
h Leonis	5 $\frac{1}{2}$	0.90	12.4	10 13.2	19 5.8	-10 26.7	+1.2685	0.5750	0.1479	+90	+56
o Leonis	3 $\frac{1}{2}$	0.93	12.2	10 24.7	23 6.7	- 6 34.4	+0.4723	0.5728	0.1521	+65	- 5
B. A. C. 3308	6	+1.01	-12.1	+ 9 28.4	20 5 50.9	- 0 4.5	+0.3835	0.5692	-0.1585	+59	-10
B. A. C. 3407	6	1.03	12.5	8 51.5	6 35.9	+ 0 38.9	+0.8952	0.5685	0.1593	+90	+20
$\pi$ Leonis	5	1.04	12.6	8 35.5	7 31.9	+ 1 33.0	+1.0184	0.5679	0.1600	+90	+29
43 Leonis	6 $\frac{1}{2}$	1.16	12.6	7 7.3	17 46.8	+11 26.8	+0.8521	0.5627	0.1678	+90	+16
48 Leonis	5 $\frac{1}{2}$	1.23	12.1	7 32.6	23 9.0	- 7 22.0	-0.4915	0.5604	0.1710	+ 8	-64
35 Sextantis	6 $\frac{1}{2}$	+1.28	-12.6	+ 5 20.8	21 3 4.7	- 3 34.2	+1.0990	0.5587	-0.1733	+90	+33
37 Sextantis	6 $\frac{1}{2}$	1.28	11.9	6 58.5	4 20.1	- 2 21.2	-0.8015	0.5583	0.1739	-10	-83
38 Sextantis	6	1.29	11.9	6 57.0	4 54.1	- 1 48.5	-0.8742	0.5580	0.1741	-15	-83
d Leonis	4 $\frac{1}{2}$	1.38	12.5	4 13.9	11 3.2	+ 4 8.5	+0.8628	0.5554	0.1769	+90	+15
75 Leonis	5 $\frac{1}{2}$	1.49	12.6	2 38.4	18 53.5	+11 43.2	+1.1231	0.5523	0.1793	+90	+34
79 Leonis	5 $\frac{1}{2}$	+1.53	-12.5	+ 2 2.1	22 4.8	- 9 11.7	+1.1820	0.5513	-0.1801	+90	+40
$\gamma$ Leonis	5	1.53	11.8	3 29.1	23 55.0	- 7 25.1	-0.6628	0.5504	0.1804	- 2	-82
URANUS				+ 1 8.4	22 16 38.3	+ 8 45.9	-1.2414	0.5467	0.1797	-46	-89
13 Virginis	6 $\frac{1}{2}$	1.83	11.0	- 0 9.1	23 0 14.4	- 7 52.5	-1.2615	0.5451	0.1804	-49	-90
$\theta$ Virginis	4 $\frac{1}{2}$	2.13	9.7	4 55.7	24 1 12.0	- 7 42.0	-0.6116	0.5426	0.1716	0	-77
81 Virginis	5 $\frac{1}{2}$	+2.27	- 8.7	- 7 17.3	14 42.1	+ 5 22.8	-0.3538	0.5424	-0.1636	+13	-56
m Virginis	5 $\frac{1}{2}$	2.31	8.6	8 7.5	16 40.1	+ 7 17.1	+0.2237	0.5424	0.1621	+46	-92
B. A. C. 4591	6	2.35	8.5	9 8.0	19 23.7	+ 9 55.5	+0.8666	0.5426	0.1601	+81	+15
W. xiii. 825	6	2.38	7.9	8 59.7	23 35.6	-10 0.5	+0.0538	0.5429	0.1569	+35	-31
95 Virginis	6	2.40	7.1	8 45.9	25 4 56.1	- 4 50.0	-1.0224	0.5431	0.1526	-29	-90
96 Virginis	6 $\frac{1}{2}$	+2.44	- 7.1	- 9 47.5	6 2.3	- 3 45.9	-0.0827	0.5431	-0.1517	+27	-39
$\kappa$ Virginis	4 $\frac{1}{2}$	2.44	6.8	9 44.5	7 56.0	- 1 55.8	-0.4227	0.5434	0.1500	+ 8	-61
2 Libræ	6	2.51	6.5	11 11.4	13 3.1	+ 3 1.7	+0.3857	0.5440	0.1452	+54	-13
$\alpha^1$ Libræ	6	2.74	2.9	15 8.1	26 16 55.3	+ 6 1.2	+1.0344	0.5470	0.1257	+75	+28
$\alpha^2$ Libræ	6	2.74	2.8	14 43.4	17 53.8	+ 6 57.8	+0.4764	0.5470	0.1136	+57	- 8
$\gamma$ Libræ	4 $\frac{1}{2}$	+2.76	- 1.8	-14 24.3	23 55.2	-11 12.2	-0.5317	0.5475	-0.1060	- 3	-71
$\eta$ Libræ	6	2.78	1.2	15 18.4	27 4 1.4	- 7 14.0	+0.0292	0.5482	0.1007	+27	-33
$\theta$ Libræ	4 $\frac{1}{2}$	2.82	- 0.6	16 23.5	8 40.5	- 2 43.7	+0.7651	0.5487	0.0942	+74	+ 9
49 Libræ	6	2.83	+ 0.1	16 11.6	11 50.5	+ 0 20.2	+0.2558	0.5488	0.0899	+39	-20
$\phi$ Ophiuchi	5	2.86	2.3	16 21.6	28 2 32.6	- 9 25.9	-0.7298	0.5500	0.0696	-19	-90
24 Scorpii	5	+2.87	+ 3.1	-17 31.0	7 29.8	- 4 38.3	+0.2202	0.5504	-0.0611	+34	-22
29 Ophiuchi	6	2.87	4.6	18 42.7	17 8.5	+ 4 41.8	+1.0170	0.5504	0.0471	+72	+28
B. A. C. 6060	6	2.80	8.4	18 46.7	29 18 55.5	+ 5 39.0	+0.4081	0.5499	-0.0065	+41	-11
B. A. C. 6294	6	2.71	10.7	18 28.7	30 11 57.7	- 1 51.6	+0.1942	0.5480	+0.0203	+29	-23
$\rho^1$ Sagittarii	4	2.50	13.0	18 3.6	31 12 17.3	- 2 18.2	+0.6774	0.5444	0.0568	+68	+ 4
$\rho^2$ Sagittarii	5 $\frac{1}{2}$	+2.50	+13.1	-18 31.0	12 21.4	- 2 14.3	+1.1885	0.5440	+0.0568	+74	+46
$\sigma^1$ Sagittarii	6	2.41	13.5	16 33.1	21 37.5	+ 6 44.3	-0.4015	0.5423	0.0705	0	-60
$\sigma^2$ Sagittarii	5	+2.40	+13.6	-16 23.3	22 30.7	+ 7 35.8	-0.5200	0.5421	+0.0718	- 6	-70
JUNE.											
$\zeta$ Sagittarii	5 $\frac{1}{2}$	+2.33	+13.9	-15 47.5	1 6 7.0	- 9 2.1	-0.5973	0.5407	+0.0819	- 9	-78
$\beta$ Capricorni	3	2.20	14.4	15 8.3	17 32.6	+ 2 2.2	-0.2974	0.5384	0.0971	+ 9	-53
B. A. C. 7063	6	2.16	14.8	15 26.1	22 31.1	+ 6 53.4	+0.5333	0.5373	0.1034	+60	- 5
B. A. C. 7087	6	2.13	14.5	14 6.8	2 0 7.6	+ 8 25.2	-0.7676	0.5371	0.1050	-17	-90
$\tau^1$ Capricorni	5 $\frac{1}{2}$	+2.12	+15.0	-15 32.5	1 40.6	+ 9 55.3	+0.9777	0.5370	+0.1070	+75	+24
$\tau^2$ Capricorni	5	+2.11	+14.9	-15 21.2	2 38.6	+10 51.5	+0.8724	0.5365	+0.1082	+75	+16

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1850.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$y'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
8 Aquarii	6	+1.99	+14.6	-13 29.5	2 13 1.6	- 3 4.5	0.0000	0.5350	+0.1198	+28	-35
9 Aquarii	6	1.99	14.8	13 58.4	13 37.9	- 2 29.3	+0.6033	0.5347	0.1207	+68	- 1
$\epsilon^2$ Capricorni	6	1.72	13.4	9 48.1	3 12 31.2	- 4 17.7	-0.9559	0.5320	0.1434	-25	-90
B. A. C. 7620	6	1.66	13.8	10 50.9	16 12.3	- 0 43.3	+0.7244	0.5319	0.1463	+79	+ 6
$\theta$ Aquarii	4.5	1.56	12.7	8 21.1	4 4 1.2	+10 44.3	-0.2163	0.5314	0.1559	+20	-47
B. A. C. 7774	6	+1.55	+13.2	- 9 36.6	4 2.4	+10 45.5	+1.1593	0.5314	+0.1559	+81	+38
$\rho$ Aquarii	5.5	1.54	12.7	8 23.6	5 41.0	-11 36.0	+0.0980	0.5316	0.1571	+38	-29
Lalande 43974	6	1.48	12.1	7 8.1	11 22.2	- 6 8.0	-0.3730	0.5316	0.1608	+12	-58
67 Aquarii	6	1.41	12.0	7 33.7	17 25.4	- 0 15.8	+1.0763	0.5318	0.1650	+83	+30
B. A. C. 8094	5.5	1.25	9.6	4 7.1	5 9 45.5	- 8 25.5	+0.1218	0.5344	0.1656	+41	-28
11 Piscium	6.5	+1.19	+ 8.8	- 2 25.2	16 42.5	- 1 41.2	-0.4851	0.5358	+0.1758	+ 8	-66
13 Piscium	6.5	1.18	8.4	1 43.1	17 57.6	- 0 28.4	-1.0158	0.5359	0.1762	-25	-90
14 Piscium	6	1.17	8.4	- 1 52.8	19 2.7	+ 0 34.7	-0.6501	0.5363	0.1767	- 2	-82
44 Piscium	6	0.93	5.4	+ 1 18.3	6 20 12.0	+ 0 56.9	+0.4804	0.5446	0.1804	+66	- 8
B. A. C. 221	6	0.86	3.3	4 41.4	7 7 7.1	+11 30.9	-1.1003	0.5498	0.1793	-32	-86
B. A. C. 237	6.5	+0.82	+ 3.7	+ 2 45.8	8 33.4	-11 5.6	+1.1706	0.5511	+0.1790	+90	+39
73 Piscium	6.5	0.78	2.5	5 2.3	14 54.9	- 4 56.5	-0.0693	0.5545	0.1773	+31	-38
77 Piscium	6	0.77	2.6	4 17.8	15 21.7	- 4 30.6	+0.7807	0.5545	0.1772	+90	+10
$\epsilon$ Piscium	5.5	0.76	2.2	5 2.5	16 33.4	- 3 21.3	+0.2180	0.5554	0.1768	+48	-22
88 Piscium	6	0.75	1.6	6 23.3	19 28.2	- 0 32.3	-0.6647	0.5571	0.1758	- 2	-81
B. A. C. 410	6	+0.71	+ 1.1	+ 6 48.6	23 15.4	+ 3 7.4	-0.4357	0.5589	+0.1743	+11	-61
96 Piscium	6.5	0.69	+ 0.9	6 42.0	8 2 3.3	+ 5 49.5	+0.1615	0.5595	0.1727	+44	-24
$\sigma$ Piscium	4.5	0.66	- 0.3	8 34.7	9 25.3	-11 3.5	-0.5097	0.5658	0.1685	+ 6	-65
$\xi$ Arietis	5.5	0.51	2.6	10 5.3	9 24.1	+ 5 38.8	+0.7521	0.5773	0.1545	+90	+11
B. A. C. 755	6	0.50	2.6	10 2.7	3 34.2	+ 6 27.1	+0.9241	0.5780	0.1536	+90	+23
31 Arietis	5.5	+0.48	- 3.6	+11 56.9	7 45.3	+10 29.1	-0.3691	0.5811	+0.1493	+14	-52
38 Arietis	5	0.47	3.8	11 57.6	11 17.6	-10 6.3	+0.1413	0.5831	0.1456	+43	-22
Lalande 5725	6	0.39	4.8	12 44.8	20 14.3	- 1 29.5	+0.6005	0.5897	0.1345	+77	+ 5
B. A. C. 1119	6	0.34	6.8	16 9.7	10 9 37.5	+11 23.0	-1.1439	0.5988	0.1145	-39	-74
B. A. C. 1272	6	0.28	7.8	17 1.8	20 56.2	- 1 44.9	-0.8158	0.6056	0.0950	-13	-73
$\delta^1$ Tauri	4	+0.25	- 8.1	+17 16.2	11 2 45.2	+ 3 50.2	-0.5323	0.6094	+0.0839	+ 5	-57
$\alpha$ Tauri	1	0.22	8.3	16 16.6	7 47.6	+ 8 40.4	+0.8488	0.6116	+0.0740	+90	+26
NEW MOON.											
$\lambda$ Geminorum	4	0.20	10.8	16 44.7	13 21 1.0	- 4 38.4	+0.8250	0.6156	-0.0606	+90	+26
W. vii. 685	6	+0.23	-10.6	+17 19.7	14 2 14.4	+ 0 22.2	-0.0918	0.6137	-0.0710	+29	-27
68 Geminorum	5.5	0.22	10.8	16 4.2	2 57.3	+ 1 3.3	+1.0932	0.6132	0.0730	+90	+45
$f$ Geminorum	6	0.24	10.6	17 55.9	5 10.6	+ 3 11.3	-0.9053	0.6124	0.0773	-19	-72
1 Cancri	6	0.28	10.8	16 5.6	11 58.9	+ 9 43.0	+0.3302	0.6089	0.0907	+55	- 6
5 Cancri	6.5	0.29	10.6	16 46.1	13 43.6	+11 23.5	-0.4948	0.6078	0.0942	+ 7	-55
29 Cancri	6	+0.37	-10.8	+14 35.2	15 0 26.3	- 2 19.3	+0.5494	0.6015	-0.1133	+73	+ 4
$\xi$ Leonis	5.5	0.38	10.7	11 48.3	16 2 29.8	- 1 24.1	-0.1069	0.5855	0.1494	+29	-36
$\sigma$ Leonis	3.5	0.66	10.9	10 24.7	6 15.3	+ 2 21.9	+0.6982	0.5829	0.1537	+90	+ 8
B. A. C. 3398	6	0.72	10.8	9 28.4	12 46.7	+ 8 38.9	+0.6200	0.5781	0.1603	+79	+ 3
B. A. C. 3407	6	0.73	10.9	8 51.5	13 30.5	+ 9 21.3	+1.1231	0.5778	0.1611	+93	+38
$\pi$ Leonis	5	+0.74	-10.9	+ 8 35.5	14 24.7	+10 13.4	+1.2465	0.5771	-0.1620	+90	+51
43 Leonis	6.5	0.85	10.8	7 7.3	17 0 21.7	- 4 10.8	+1.0912	0.5714	0.1695	+90	+33
48 Leonis	5.5	0.91	10.4	7 32.6	5 35.0	+ 0 56.1	-0.2309	0.5678	0.1729	+22	-46
37 Sextantis	6.5	0.97	10.2	6 58.5	10 38.1	+ 5 44.2	-0.5325	0.5650	0.1759	+ 5	-68
38 Sextantis	6	0.98	10.2	6 57.0	11 11.5	+ 6 16.4	-0.6061	0.5648	0.1761	+ 1	-74
56 Leonis	6.5	+1.03	-10.1	+ 6 47.8	15 7.4	+10 4.2	-1.1471	0.5628	-0.1778	-36	-84
$\delta$ Leonis	4.5	1.07	10.8	4 13.9	17 11.7	-11 55.6	+1.1110	0.5615	0.1786	+90	+34
80 Leonis	6.5	1.21	9.7	4 29.2	18 4 49.0	- 0 41.7	-1.2500	0.5559	0.1829	-47	-86
$\tau$ Leonis	5	1.22	9.9	3 29.1	5 47.4	+ 0 14.8	-0.3910	0.5555	0.1822	+13	-58
89 Leonis	6	1.26	9.7	3 41.8	8 47.9	+ 3 9.3	-1.1614	0.5542	0.1826	-37	-87
$\beta$ Virginis	3.5	+1.36	- 9.4	+ 2 24.6	16 24.7	+10 31.1	-1.2241	0.5509	-0.1829	-44	-88
URANUS				+ 1 7.2	22 15.0	- 7 50.0	-0.9497	0.5490	-0.1825	-20	-89

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'n's from 1855.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.		
		$\Delta\alpha$	$\Delta\delta$										
13 Virginis	6 $\frac{1}{2}$	+1.55	-9.2	-0 9.1	19 5 46.0	-0 33.5	-0.9959	0.5467	-0.1818	-23	-90		
$\eta$ Virginis	3 $\frac{1}{2}$	1.55	9.0	0 1.9	6 21.9	+0 1.3	-1.2306	0.5465	0.1817	-45	-90		
38 Virginis	6	1.78	8.3	2 55.8	22 26.5	-8 24.8	-1.0691	0.5432	0.1764	-30	-90		
$\theta$ Virginis	4 $\frac{1}{2}$	1.90	8.1	4 55.6	20 6 34.8	-0 31.9	-0.3755	0.5417	0.1726	+13	-58		
81 Virginis	5 $\frac{1}{2}$	2.09	7.3	7 17.3	20 5.0	-11 27.1	-0.1338	0.5407	0.1644	+25	-42		
m Virginis	5 $\frac{1}{2}$	+2.13	-7.3	-8 7.5	22 3.2	-9 32.5	+0.4392	0.5405	-0.1630	+60	-10		
B. A. C. 4591	6	2.18	7.2	9 8.0	21 0 47.1	-6 53.7	+1.0780	0.5404	0.1609	+81	+30		
W. xiii. 825	6	2.23	6.7	8 59.7	4 59.9	-2 48.8	+0.2597	0.5404	0.1578	+47	-20		
95 Virginis	6	2.27	5.8	8 45.9	10 21.9	+2 23.1	-0.8243	0.5407	0.1536	-15	-90		
96 Virginis	6 $\frac{1}{2}$	2.30	5.9	9 47.5	11 28.2	+3 27.4	+0.1131	0.5407	0.1522	+38	-28		
$\kappa$ Virginis	4 $\frac{1}{2}$	+2.31	-5.8	-9 44.5	13 22.7	+5 18.3	-0.2302	0.5407	-0.1510	+19	-48		
2 Libræ	6	2.39	5.6	11 11.4	18 31.4	+10 17.4	+0.5712	0.5408	0.1460	+68	-3		
$\alpha^1$ Libræ	6	2.74	2.2	15 8.1	22 22 36.3	-10 30.4	+1.1692	0.5436	0.1158	+75	+41		
$\alpha^2$ Libræ	6	2.74	2.0	14 43.4	23 35.4	-9 33.3	+0.6066	0.5437	0.1146	+67	-1		
$\gamma$ Libræ	4 $\frac{1}{2}$	2.79	1.1	14 24.3	23 5 39.9	-3 40.1	-0.4142	0.5444	0.1072	+4	-61		
$\eta$ Libræ	6	+2.83	-0.5	-15 18.4	9 48.2	+0 20.3	+0.1389	0.5449	-0.1020	+34	-27		
$\theta$ Libræ	4 $\frac{1}{2}$	2.88	+0.1	16 23.5	14 29.8	+4 53.0	+0.8654	0.5457	0.0955	+74	+16		
49 Libræ	6	2.90	0.5	16 11.6	17 41.3	+7 58.4	+0.3517	0.5459	0.0935	+46	-15		
$\phi$ Ophiuchi	5	2.99	3.0	16 21.5	24 8 30.4	-1 40.8	-0.6706	0.5474	0.0704	-15	-98		
24 Scorpis	5	3.04	3.8	17 31.0	13 29.6	+3 8.9	+0.2723	0.5479	0.0631	+38	-19		
29 Ophiuchi	6	+3.11	+5.2	-18 42.7	23 12.1	-11 27.2	+1.0486	0.5486	-0.0490	+72	+31		
B. A. C. 6060	6	3.16	9.2	18 46.6	26 1 5.6	-10 23.5	+0.3791	0.5492	-0.0087	+39	-13		
B. A. C. 6294	6	3.14	11.9	18 28.7	18 9.2	+6 7.4	+0.1315	0.5486	+0.0180	+25	-27		
$\rho^1$ Sagittarii	4	3.08	14.9	18 3.6	27 18 27.6	+5 39.4	+0.5633	0.5453	0.0554	+58	-3		
$\rho^2$ Sagittarii	5 $\frac{1}{2}$	3.08	14.9	18 31.0	18 31.7	+5 43.4	+1.0750	0.5453	0.0556	+72	+33		
$\sigma^1$ Sagittarii	6	+3.01	+15.8	-16 33.0	28 3 46.8	-9 18.9	-0.5373	0.5440	+0.0687	-7	-72		
$\sigma^2$ Sagittarii	5	3.00	15.8	16 23.2	4 39.9	-8 27.5	-0.6597	0.5436	0.0700	-14	-86		
$\sigma^3$ Sagittarii	5 $\frac{1}{2}$	2.94	16.5	15 47.4	12 15.3	-1 6.3	-0.7499	0.5423	0.0802	-18	-90		
$\beta$ Capricorni	3	2.86	17.2	15 8.2	23 39.3	+9 56.4	-0.4736	0.5400	0.0955	-1	-66		
B. A. C. 7063	6	2.83	17.6	15 26.0	29 4 39.2	-9 13.0	+0.3494	0.5390	0.1019	+47	-15		
B. A. C. 7087	6	+2.81	+17.5	-14 6.7	6 13.5	-7 41.5	-0.9557	0.5398	+0.1034	-29	-90		
$\tau^1$ Capricorni	5 $\frac{1}{2}$	2.81	17.9	15 32.4	7 46.3	-6 11.7	+0.7912	0.5386	0.1055	+75	+11		
$\tau^2$ Capricorni	5	2.80	17.9	15 21.1	8 44.3	-5 15.4	+0.6857	0.5384	0.1067	+73	+4		
8 Aquarii	6	2.70	18.2	13 29.4	19 6.7	+4 48.0	-0.2084	0.5363	0.1185	+16	-47		
9 Aquarii	6	2.70	18.3	13 58.3	19 42.9	+5 23.1	+0.3949	0.5359	0.1194	+52	-13		
18 Aquarii	6	+2.61	+18.4	-13 21.9	30 7 21.1	-7 19.9	+1.1839	0.5342	+0.1312	+77	+42		
$\alpha^1$ Capricorni	6	2.49	17.8	9 47.9	18 38.2	+3 36.8	-1.2059	0.5321	0.1422	-47	-90		
$\alpha^2$ Capricorni	5 $\frac{1}{2}$	2.49	18.3	11 53.4	18 43.0	+3 41.4	+1.1105	0.5321	0.1422	+78	+34		
B. A. C. 7620	6	+2.45	+18.1	-10 50.8	22 19.9	+7 11.8	+0.4805	0.5319	+0.1451	+61	-8		

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$\theta$ Aquarii	4 $\frac{1}{2}$	+2.35	+17.4	-8 21.0	1 10 12.9	-5 16.6	-0.4789	0.5309	+0.1545	+6	-66
B. A. C. 7774	6	2.35	17.8	9 36.5	10 14.2	-5 15.3	+0.9030	0.5309	0.1541	+81	+17
$\rho$ Aquarii	5 $\frac{1}{2}$	2.34	17.5	8 23.5	11 56.5	-3 36.1	-0.1644	0.5305	0.1559	+23	-44
Lalande 43974	6	+2.28	+16.9	-7 8.0	17 37.3	+1 54.5	-0.6454	0.5302	+0.1599	-3	-82
67 Aquarii	6	2.22	16.8	7 33.6	23 44.2	+7 50.4	+0.8095	0.5292	0.1635	+83	+11
B. A. C. 8094	5 $\frac{1}{2}$	2.07	15.0	4 7.1	2 16 17.1	-0 6.3	-0.1609	0.5293	0.1714	+25	-44
11 Piscium	6 $\frac{1}{2}$	2.00	14.1	2 25.1	23 21.0	+6 44.9	-0.7778	0.5314	0.1740	-9	-90
14 Piscium	6	1.98	13.7	-1 52.7	3 1 43.6	+9 3.1	-0.9445	0.5319	0.1749	-20	-90
44 Piscium	6	+1.76	+10.8	+1 18.4	4 3 25.8	+9 58.3	+0.2023	0.5382	+0.1783	+47	-23
B. A. C. 237	6 $\frac{1}{2}$	1.64	9.2	2 45.9	16 7.3	-1 44.0	+0.9040	0.5420	0.1769	+90	+18
73 Piscium	6 $\frac{1}{2}$	1.60	7.7	5 2.4	22 39.7	+4 36.0	-0.3440	0.5459	0.1753	+16	-55
77 Piscium	6	1.59	7.9	4 17.9	23 7.2	+5 2.5	+0.5175	0.5459	0.1751	+69	-5
$\epsilon$ Piscium	5 $\frac{1}{2}$	1.58	7.4	5 2.6	5 0 21.2	+6 14.2	-0.0508	0.5464	0.1748	+32	-37
88 Piscium	6	+1.58	+6.7	+6 23.4	3 21.3	+9 8.6	-0.9430	0.5478	+0.1738	-20	-84
B. A. C. 410	6	+1.53	+6.2	+6 48.7	7 15.3	-11 5.1	-0.7086	0.5499	+0.1723	-5	-83



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N.	S.	
		$\Delta\alpha$	$\Delta\delta$									
96 Piscium	6½	+1.50	+5.8	+ 6 42.1	d h m 5 10 8.4	- 8 17.6	-0.0975	0.5513	+0.1709	+29	-39	
$\mu$ Piscium	5	1.47	6.3	5 33.0	10 39.5	- 7 47.5	+1.1945	0.5520	0.1704	+90	+43	
$\sigma$ Piscium	4½	1.45	4.4	8 34.8	17 44.2	- 0 56.7	-0.7714	0.5562	0.1667	- 9	-82	
$\xi$ Arietis	5½	1.27	1.8	10 5.3	6 11 36.2	- 7 41.3	+0.5380	0.5675	0.1529	+71	- 1	
B. A. C. 755	6	1.26	1.7	10 2.7	12 27.8	- 6 51.4	+0.7122	0.5684	0.1524	+90	+ 9	
31 Arietis	5½	+1.25	+0.6	+11 57.0	16 46.9	- 2 41.4	-0.5925	0.5710	+0.1483	+ 2	-69	
38 Arietis	5	1.21	+0.1	11 57.7	20 25.7	+ 0 49.7	-0.0698	0.5737	0.1442	+31	-34	
Lalande 5725	6	1.11	-1.3	12 44.9	7 5 38.7	+ 9 42.9	+0.4130	0.5805	0.1338	+61	- 6	
B. A. C. 1272	6	0.91	5.2	17 1.8	8 7 0.5	+10 7.5	-0.9636	0.5979	0.0959	-23	-73	
$\gamma$ Tauri	4	0.84	5.2	15 20.8	11 44.5	- 9 19.6	+1.1537	0.6011	0.0874	+90	+49	
$\delta^1$ Tauri	4	+0.85	-5.8	+17 16.2	12 57.3	- 8 9.6	-0.6597	0.6019	+0.0853	- 3	-68	
63 Tauri	6	0.84	5.7	16 30.4	13 9.6	- 7 57.8	+0.1179	0.6019	0.0851	+42	-17	
$\delta^2$ Tauri	5½	0.85	5.9	17 10.5	13 24.9	- 7 43.2	-0.5283	0.6026	0.0841	+ 5	-57	
$\delta^3$ Tauri	5	0.84	6.0	17 39.8	13 57.6	- 7 11.8	-0.9683	0.6026	0.0836	-24	-73	
70 Tauri	6½	0.82	5.5	15 40.5	14 2.8	- 7 6.9	+1.0198	0.6026	0.0834	+90	+38	
75 Tauri	6	+0.81	-5.8	+16 6.0	15 9.5	- 6 2.7	+0.6873	0.6033	+0.0813	+90	+15	
$\theta^1$ Tauri	4	0.81	5.7	15 42.3	15 12.7	- 5 59.6	+1.0854	0.6033	0.0813	+90	+43	
$\theta^2$ Tauri	4	0.80	5.7	15 36.8	15 15.0	- 5 57.4	+1.1800	0.6033	0.0812	+90	+53	
B. A. C. 1391	5	0.81	5.9	15 56.5	15 59.4	- 5 14.7	+0.9124	0.6036	0.0796	+90	+30	
$\alpha$ Tauri	1	0.79	6.2	16 16.6	18 5.7	- 3 13.4	+0.7427	0.6052	0.0758	+90	+19	
B. A. C. 1526	5½	+0.71	-7.1	+16 58.2	9 2 26.4	+ 4 47.3	+0.6141	0.6098	+0.0588	+80	+13	
$m$ Tauri	5½	0.70	7.7	18 29.3	6 16.4	+ 8 28.0	-0.6773	0.6115	0.0518	- 4	-67	
111 Tauri	5½	0.64	8.1	17 16.5	12 48.2	- 9 16.2	+0.8085	0.6146	0.0371	+90	+27	
115 Tauri	6	0.63	8.3	17 51.7	13 50.9	- 8 16.1	+0.2677	0.6148	0.0350	+51	- 4	
117 Tauri	6½	0.62	8.1	17 8.5	14 11.4	- 7 56.4	+0.9886	0.6149	0.0345	+90	+40	
119 Tauri	5	+0.61	-8.6	+18 30.3	15 45.4	- 6 26.3	-0.3037	0.6166	+0.0307	+17	-36	
B. A. C. 1728	6	0.60	8.3	16 58.1	15 47.7	- 6 24.1	+1.2114	0.6156	0.0307	+90	+61	
120 Tauri	6	0.61	8.6	18 27.4	16 15.5	- 5 57.4	-0.2413	0.6158	0.0301	+21	-32	
127 Tauri	6½	0.59	8.8	18 55.4	19 48.0	- 2 33.7	-0.6081	0.6170	0.0218	0	-58	
130 Tauri	6	0.57	8.7	17 41.0	21 32.1	- 0 53.8	+0.6454	0.6174	+0.0179	+85	+19	
NEW MOON.												
$\xi$ Leonis	5½	+0.51	-9.6	+11 48.3	13 11 47.0	+ 9 50.1	+0.0626	0.5948	-0.1501	+38	-26	
$\sigma$ Leonis	3½	0.53	9.7	10 24.7	15 34.2	-10 31.3	+0.8656	0.5924	0.1548	+90	+19	
B. A. C. 3345	6	0.54	9.3	11 57.4	18 11.1	- 8 0.4	-1.0735	0.5911	0.1573	-30	-78	
B. A. C. 3398	6	+0.58	-9.5	+ 9 28.4	21 53.6	- 4 26.2	+0.8019	0.5885	-0.1613	+90	+14	
A Leonis	4½	0.61	9.0	10 33.4	14 2 40.8	+ 0 10.4	-1.0615	0.5853	0.1660	-29	-80	
44 Leonis	6	0.67	8.7	9 22.0	10 2.2	+ 7 15.6	-1.1207	0.5809	0.1718	-34	-81	
48 Leonis	5½	0.71	8.8	7 32.7	14 9.2	+11 13.7	-0.0100	0.5794	0.1748	+34	-33	
37 Sextantis	6½	0.75	8.6	6 58.6	19 2.4	- 8 3.6	-0.3019	0.5753	0.1778	+18	-51	
38 Sextantis	6	+0.76	-8.6	+ 6 57.1	19 34.5	- 7 32.7	-0.3707	0.5749	-0.1781	+14	-56	
56 Leonis	6½	0.79	8.4	6 47.9	23 22.6	- 3 52.7	-0.8978	0.5725	0.1799	-17	-84	
$c$ Leonis	5½	0.82	8.2	6 43.1	15 1 27.2	- 1 52.5	-1.1937	0.5714	0.1804	-41	-84	
80 Leonis	6½	0.95	8.0	4 29.3	12 37.7	+ 8 54.7	-0.9835	0.5652	0.1842	-23	-86	
$r$ Leonis	5	0.96	8.2	3 29.2	13 34.4	+ 9 49.5	-0.1357	0.5650	0.1845	+27	-42	
89 Leonis	6	+1.00	-7.9	+ 3 41.9	16 29.1	-11 21.9	-0.8927	0.5632	-0.1848	-16	-87	
$\beta$ Virginis	3½	1.09	7.6	2 24.7	23 52.0	- 4 13.9	-0.9466	0.5599	0.1854	-20	-88	
URANUS				+ 0 50.6	16 6 37.4	+ 2 17.8	-0.5925	0.5556	0.1842	+ 2	-75	
13 Virginis	6½	1.25	7.2	- 0 9.0	12 50.3	+ 8 18.4	-0.7137	0.5543	0.1839	- 5	-90	
$\eta$ Virginis	3½	1.25	7.1	0 1.8	13 25.1	+ 8 52.1	-0.9466	0.5540	0.1837	-20	-90	
38 Virginis	6	+1.46	-6.4	- 2 55.8	17 5 5.9	+ 0 2.2	-0.7825	0.5491	-0.1786	-10	-90	
$k$ Virginis	6	1.50	6.3	3 11.5	8 9.6	+ 2 59.9	-1.0549	0.5484	0.1771	-29	-90	
$\theta$ Virginis	4½	1.59	6.2	4 55.6	13 3.6	+ 7 44.5	-0.0964	0.5471	0.1745	+28	-40	
$l^s$ Virginis	6	1.73	5.2	5 39.8	23 37.3	- 6 2.1	-1.1342	0.5453	0.1679	-37	-90	
81 Virginis	5½	1.79	5.6	7 17.3	18 2 18.8	- 3 25.8	+0.1378	0.5449	0.1662	+41	-27	
$m$ Virginis	5½	+1.83	-5.5	- 8 7.5	4 15.0	- 1 33.3	+0.7039	0.5445	-0.1648	+82	+ 5	
B. A. C. 4647	6	+1.89	-4.6	- 7 29.6	10 43.2	+ 4 42.6	-1.0174	0.5436	-0.1596	-28	-90	

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1850.	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$-\Delta\delta$	$d$ $h$ $m$	$h$ $m$					
W. xiii. 825	6	+1.93	-5.1	-8 59.7	18 11 5.7	+5 4.5	+0.5222	0.5436	-0.1595	+66 -6
94 Virginis	6	1.96	4.2	8 20.6	16 11.1	+10 0.2	-0.9725	0.5433	0.1551	-25 -90
95 Virginis	6	1.97	4.4	8 45.9	16 23.3	+10 11.9	-0.5540	0.5430	0.1546	+1 -72
96 Virginis	6½	2.01	4.6	9 47.5	17 29.1	+11 15.7	+0.3744	0.5430	0.1537	+54 -14
κ Virginis	4½	2.03	4.3	9 44.5	19 22.2	-10 54.8	+0.0321	0.5429	0.1525	+33 -33
2 Libræ	6	+2.11	-4.2	-11 11.4	19 0 27.7	-5 58.9	+0.8230	0.5428	-0.1472	+79 +12
ξ Libræ	6	2.30	2.0	11 25.8	15 30.3	+8 35.3	-1.0240	0.5425	0.1318	-31 -90
ο² Libræ	6	2.52	1.1	14 43.4	20 5 22.2	-1 59.1	+0.8285	0.5426	0.1162	+76 +17
γ Libræ	4½	2.57	-0.1	14 24.3	11 26.0	+3 53.3	-0.1982	0.5433	0.1081	+16 -46
η Libræ	6	2.64	+0.4	15 18.4	15 34.2	+7 53.6	+0.3497	0.5438	0.1031	+47 -15
θ Libræ	4½	+2.71	+0.7	-16 23.5	20 15.9	-11 33.5	+1.0673	0.5440	-0.0973	+74 -32
49 Libræ	6	2.74	1.2	16 11.6	23 27.5	-8 28.0	+0.5462	0.5441	0.0926	+60 -4
φ Ophiuchi	5	2.88	3.6	16 21.5	21 14 18.7	+5 55.0	-0.4072	0.5454	0.0725	-5 -68
24 Scorpii	5	2.94	4.2	17 31.0	19 18.8	+10 45.5	+0.4354	0.5457	0.0652	+49 -10
29 Ophiuchi	6	3.06	5.4	18 42.7	22 5 3.2	-3 48.7	+1.1951	0.5465	0.0506	+72 +47
B. A. C. 6060	6	+3.23	+9.6	-18 46.6	23 7 2.4	-2 39.3	+0.4772	0.5476	-0.0107	+47 -7
B. A. C. 6204	6	3.29	12.3	18 28.7	24 0 8.7	-10 5.7	+0.1945	0.5478	+0.0159	+28 -24
ρ Sagittarii	4	3.32	15.7	18 3.5	25 0 28.0	-10 32.8	+0.5763	0.5457	0.0534	+59 -2
ρ² Sagittarii	5½	3.33	15.7	18 30.9	0 32.0	-10 28.9	+1.0857	0.5457	0.0535	+72 +34
ε Sagittarii	6	3.30	16.9	16 33.0	9 46.5	-1 31.9	-0.5426	0.5445	0.0667	-8 -73
σ Sagittarii	5	+3.29	+17.1	-16 23.2	10 39.4	-0 40.6	-0.6668	0.5444	+0.0680	-15 -87
g Sagittarii	5½	3.28	17.8	15 47.4	18 13.8	+6 39.5	-0.7736	0.5437	0.0783	-20 -90
β Capricorni	3	3.24	19.0	15 8.2	26 5 35.4	-6 20.0	-0.5196	0.5417	0.0939	-4 -70
B. A. C. 7063	6	3.23	19.4	15 26.0	10 34.2	-1 30.5	+0.2919	0.5409	0.1001	+43 -18
B. A. C. 7087	6	3.21	19.5	14 6.7	12 8.0	+0 0.4	-1.0141	0.5407	0.1018	-34 -90
γ Capricorni	5½	+3.23	+19.5	-15 32.4	13 40.5	+1 30.0	+0.7258	0.5404	+0.1040	+75 +7
γ² Capricorni	5	3.22	19.6	15 21.1	14 38.1	+2 25.8	+0.6186	0.5400	0.1052	+67 0
Lalande 40522	6	3.18	20.4	14 55.3	27 0 19.9	+11 49.7	+1.2137	0.5389	0.1162	+75 +47
8 Aquarii	6	3.16	20.4	13 29.4	0 57.4	-11 33.9	-0.2951	0.5386	0.1171	+11 -53
9 Aquarii	6	3.17	20.5	13 58.3	1 33.5	-10 59.0	+0.3061	0.5383	0.1180	+46 -17
18 Aquarii	6	+3.11	+21.1	-13 21.8	13 7.9	+0 14.2	+1.0708	0.5365	+0.1301	+77 +31
λ Capricorni	5½	3.06	21.3	11 53.3	28 0 26.1	+11 11.9	+0.9765	0.5348	0.1402	+78 +23
B. A. C. 7620	6	3.04	21.2	10 50.7	4 2.0	-9 18.7	+0.3412	0.5345	0.1442	+51 -16
θ Aquarii	4½	2.96	20.9	8 21.0	15 51.5	+2 9.4	-0.6365	0.5331	0.1537	-3 -81
B. A. C. 7774	6	2.96	21.2	9 36.4	16 52.7	+2 10.5	+0.7444	0.5331	0.1537	+79 +7
ρ Aquarii	5½	+2.95	+21.0	-8 23.5	17 34.7	+3 49.5	-0.3255	0.5329	+0.1550	+14 -54
Lalande 43974	6	2.91	20.7	7 8.0	23 14.3	+9 19.0	-0.7901	0.5325	0.1589	-13 -90
67 Aquarii	6	2.86	20.8	7 33.6	29 5 20.1	-8 46.3	+0.6304	0.5322	0.1626	+76 0
B. A. C. 8094	5½	2.77	19.6	4 7.0	21 52.0	+7 15.9	-0.3643	0.5319	0.1708	+14 -57
11 Piscium	6½	2.72	18.8	-2 25.0	30 4 56.4	-9 52.4	-0.9924	0.5322	0.1732	-24 -90
44 Piscium	6	+2.53	+15.7	+1 18.5	31 9 12.0	-6 28.0	-0.0340	0.5363	+0.1770	+33 -36
B. A. C. 237	6½	+2.43	+14.2	+2 45.9	22 3.0	+5 59.2	+0.6717	0.5396	+0.1754	+84 +3

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73 Piscium	6½	+2.40	+12.7	+5 2.5	1 4 41.6	-11 34.8	-0.5919	0.5421	+0.1737	+2 -74
77 Piscium	6	2.38	12.9	4 18.0	5 9.6	-11 7.6	+0.2781	0.5423	0.1736	+51 -19
σ Piscium	5½	2.38	12.5	5 2.7	6 24.8	-9 54.8	-0.2957	0.5428	0.1732	+18 -51
88 Piscium	6	2.37	11.8	6 23.5	9 28.1	-6 57.3	-1.1965	0.5438	0.1720	-41 -84
B. A. C. 410	6	2.33	11.2	6 48.8	13 26.6	-3 6.3	-0.9596	0.5455	0.1704	-21 -84
96 Piscium	6½	+2.30	+10.9	+6 42.2	16 23.3	-0 15.3	-0.3417	0.5465	+0.1688	+16 -54
μ Piscium	5	2.27	11.2	5 33.1	16 55.3	+0 15.7	+0.9647	0.5465	0.1689	+90 +23
ο Piscium	4½	2.27	9.3	8 34.9	2 0 9.4	+7 15.9	-1.0228	0.5409	0.1651	-26 -82
ξ Arietis	5½	2.09	6.3	10 5.4	18 29.3	+0 59.5	+0.3074	0.5597	0.1515	+53 -14
B. A. C. 755	6	2.08	6.3	10 2.8	19 22.7	+1 51.1	+0.4878	0.5597	0.1510	+76 -4
31 Arietis	5½	+2.07	+5.0	+11 57.1	23 49.3	+6 8.7	-0.8329	0.5626	+0.1465	-13 -78
38 Arietis	5	+2.04	+4.4	+11 57.8	3 3 34.8	+9 46.4	-0.2988	0.5649	+0.1427	+18 -47

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1885 0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
Ialande 5725	6	+1.94	+2.8	+12 44.9	3 13 5.4	- 5 2.8	+0.1976	0.5706	+0.1325	+46	-18
B. A. C. 1272	6	1.69	-2.4	17 1.9	4 15 19.4	- 3 45.7	-1.1682	0.5870	0.0957	-42	-73
48 Tauri	6	1.62	2.2	15 6.7	18 34.2	- 0 38.3	+1.0802	0.5893	0.0897	+90	+41
$\gamma$ Tauri	4	1.61	2.4	15 20.9	20 13.4	+ 0 57.2	+0.9863	0.5902	0.0875	+90	+35
$\delta$ Tauri	4	1.62	3.2	17 16.2	21 28.6	+ 2 9.6	-0.8521	0.5913	0.0849	-15	-73
63 Tauri	6	+1.61	-3.0	+16 30.4	21 41.4	+ 2 21.9	-0.0624	0.5913	+0.0845	+31	-27
$\delta$ Tauri	5 $\frac{1}{2}$	1.62	3.1	17 10.5	21 57.4	+ 2 37.2	-0.7153	0.5915	0.0842	- 6	-73
$\delta$ Tauri	5	1.62	3.4	17 39.8	22 35.2	+ 3 13.8	-1.1569	0.5920	0.0828	-41	-73
70 Tauri	6 $\frac{1}{2}$	1.58	2.8	15 40.6	22 36.5	+ 3 14.9	+0.8551	0.5920	0.0828	+90	+26
71 Tauri	6	1.56	2.8	15 21.4	22 54.6	+ 3 32.3	+1.2036	0.5920	0.0826	+90	+55
75 Tauri	6	+1.57	-3.1	+16 6.0	23 45.5	+ 4 21.2	+0.5207	0.5925	+0.0809	+70	+ 6
$\theta$ Tauri	4	1.56	3.0	15 42.3	23 48.8	+ 4 24.5	+0.9251	0.5925	0.0809	+90	+31
$\theta$ Tauri	4	1.56	2.9	15 36.9	23 51.2	+ 4 26.8	+1.0195	0.5925	0.0809	+90	+38
B. A. C. 1391	5	1.55	3.1	15 56.5	5 0 37.2	+ 5 10.9	+0.7513	0.5929	0.0793	+90	+19
81 Tauri	6 $\frac{1}{2}$	1.54	3.0	15 26.4	0 40.0	+ 5 13.7	+1.2615	0.5932	0.0793	+90	+65
85 Tauri	6	+1.54	-3.1	+15 36.1	1 9.4	+ 5 41.9	+1.1368	0.5932	+0.0788	+90	+48
$\alpha$ Tauri	1	1.53	3.5	16 16.6	2 47.8	+ 7 16.6	+0.5807	0.5943	0.0756	+76	+10
B. A. C. 1526	5 $\frac{1}{2}$	1.43	4.8	16 58.2	11 25.7	- 8 25.6	+0.4638	0.5993	0.0591	+66	+ 5
$m$ Tauri	5 $\frac{1}{2}$	1.40	5.7	18 29.3	15 23.3	- 4 37.2	-0.8408	0.6013	0.0515	-15	-72
111 Tauri	5 $\frac{1}{2}$	1.30	6.2	17 16.5	22 7.9	+ 1 51.5	+0.6781	0.6040	0.0385	+90	+19
115 Tauri	6	+1.30	-6.5	+17 51.7	23 12.6	+ 2 53.6	+0.1333	0.6046	+0.0365	+43	-11
117 Tauri	6 $\frac{1}{2}$	1.28	6.3	17 8.5	23 33.7	+ 3 13.8	+0.8642	0.6050	0.0351	+90	+31
119 Tauri	5	1.28	6.9	18 30.3	6 1 10.6	+ 4 46.8	-0.4442	0.6053	0.0323	+ 9	-46
B. A. C. 1728	6	1.26	6.5	16 58.1	1 13.0	+ 4 49.1	+1.0914	0.6053	0.0323	+90	+48
120 Tauri	6	1.27	6.9	18 27.4	1 41.6	+ 5 16.6	-0.3792	0.6057	0.0308	+13	-41
122 Tauri	6	+1.24	-6.7	+16 58.1	3 6.1	+ 6 37.7	+1.1471	0.6064	+0.0283	+90	+54
127 Tauri	6 $\frac{1}{2}$	1.24	7.4	18 55.4	5 20.7	+ 8 46.9	-0.7440	0.6071	0.0236	- 9	-71
130 Tauri	6	1.20	7.3	17 41.0	7 7.9	+10 29.8	+0.5279	0.6081	+0.0198	+71	+12
71 Orionis	6	1.09	8.6	19 11.5	17 42.7	- 3 20.9	-0.8829	0.6115	-0.0033	-18	-71
26 Geminorum	5 $\frac{1}{2}$	0.97	9.1	17 45.2	7 4 18.9	+ 6 49.4	+0.3855	0.6132	0.0259	+59	+ 4
$\lambda$ Geminorum	4	+0.84	-9.5	+16 44.7	17 59.4	- 4 3.6	+0.8143	0.6141	-0.0558	+90	+26
W. vii. 685	6	0.79	9.9	17 19.7	23 13.7	+ 0 57.9	-0.0820	0.6137	0.0657	+30	-26
64 Geminorum	5 $\frac{1}{2}$	0.79	9.7	16 4.2	23 56.6	+ 1 39.0	+1.1087	0.6135	0.0684	+90	+47
$f$ Geminorum	6	0.78	9.9	17 55.9	8 2 9.8	+ 3 46.7	-0.8804	0.6134	0.0728	-18	-72
NEW MOON.											
$c$ Leonis	5 $\frac{1}{2}$	+0.70	-7.4	+ 6 43.1	11 11 25.4	+ 9 53.8	-1.0561	0.5793	-0.1817	-28	-84
80 Leonis	6 $\frac{1}{2}$	0.78	6.9	4 29.3	22 19.8	- 3 35.1	-0.8291	0.5740	0.1855	-12	-86
$r$ Leonis	5	0.80	7.0	3 29.2	23 15.0	- 2 41.8	+0.0101	0.5738	0.1858	+35	-34
89 Leonis	6	0.81	6.7	3 41.9	12 2 5.2	+ 0 2.3	-0.7316	0.5723	0.1864	- 6	-85
$\beta$ Virginis	3 $\frac{1}{2}$	+0.87	-6.3	+ 2 24.7	9 16.3	+ 6 58.4	-0.7754	0.5690	-0.1870	- 9	-88
URANUS				+ 0 21.1	17 40.2	- 8 46.4	-0.2819	0.5628	0.1858	+ 9	-51
13 Virginis	6 $\frac{1}{2}$	0.99	5.8	- 0 9.0	21 53.0	- 4 51.0	-0.5277	0.5635	0.1859	+ 5	-69
$\eta$ Virginis	3 $\frac{1}{2}$	1.00	5.6	0 1.8	22 26.8	- 4 18.3	-0.7563	0.5633	0.1857	- 8	-90
38 Virginis	6	1.17	4.9	2 55.8	13 13 40.7	+10 24.8	-0.5798	0.5581	0.1806	+ 2	-74
$k$ Virginis	6	+1.20	-4.6	- 3 11.5	16 39.4	-10 42.5	-0.8464	0.5569	-0.1792	-14	-90
$\theta$ Virginis	4 $\frac{1}{2}$	1.27	4.5	4 55.6	21 25.1	- 6 6.2	+0.1021	0.5556	0.1764	+39	-29
$l$ Virginis	6	1.40	3.6	5 39.8	14 7 41.7	+ 3 50.1	-0.9169	0.5531	0.1700	-20	-90
81 Virginis	5 $\frac{1}{2}$	1.44	4.0	7 17.3	10 18.9	+ 6 22.1	+0.3420	0.5529	0.1682	+53	-16
$m$ Virginis	5 $\frac{1}{2}$	1.47	3.9	8 7.5	12 12.1	+ 8 11.6	+0.9030	0.5524	0.1668	+82	+17
B. A. C. 4647	6	+1.52	-3.1	- 7 29.6	18 30.4	- 9 42.4	-0.7945	0.5511	-0.1613	-13	-90
W. xiii. 825	6	1.56	3.5	8 59.7	18 52.4	- 9 21.1	+0.7264	0.5511	0.1613	+81	+ 6
94 Virginis	6	1.60	2.7	8 20.5	23 50.3	- 4 32.8	-0.7534	0.5503	0.1569	-11	-90
95 Virginis	6	1.61	2.8	8 45.8	15 0 2.4	- 4 21.2	-0.3398	0.5500	0.1569	+13	-55
96 Virginis	6 $\frac{1}{2}$	1.63	3.0	9 47.5	1 6.6	- 3 19.1	+0.5795	0.5499	0.1560	+70	- 2
$\kappa$ Virginis	4 $\frac{1}{2}$	+1.66	-2.7	- 9 44.4	2 57.0	- 1 32.3	+0.2399	0.5498	-0.1542	+46	+21
2 Libræ	6	+1.75	-2.5	-11 11.3	7 55.7	+ 3 16.7	+1.0245	0.5491	-0.1492	+79	-27

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
$\xi^1$ Libræ	6	+1.91	-0.7	-11° 25.8	15 22 39.9	-6 27.5	-0.8031	0.5474	-0.1334	-16	-90
$\phi^2$ Libræ	6	2.13	+0.1	14 43.4	16 12 17.8	+6 44.2	+1.0285	0.5467	0.1174	+76	+28
$\gamma$ Libræ	4½	2.19	1.1	14 24.3	18-16.6	-11 28.5	+0.0072	0.5467	0.1099	+27	-34
$\eta$ Libræ	6	2.25	1.4	15 18.4	22 21.7	-7 31.2	+0.5476	0.5467	0.1046	+61	-4
$\theta$ Libræ	4½	2.33	1.7	16 23.5	17 2 59.9	-3 2.0	+1.2589	0.5466	0.0982	+74	+56
49 Libræ	6	+2.37	+2.2	-16 11.6	6 9.6	+0 1.7	+0.7420	0.5466	-0.0940	+74	+8
$\phi$ Ophiuchi	5	2.54	4.4	16 21.5	20 53.1	-9 43.1	-0.3083	0.5464	0.0730	+6	-54
24 Scorpii	5	2.62	4.7	17 31.0	18 1 51.4	-4 54.4	+0.6160	0.5465	0.0658	+63	+1
B. A. C. 6060	6	2.98	9.7	18 46.6	19 13 29.4	+5 35.3	+0.6216	0.5466	-0.0113	+59	+1
B. A. C. 6294	6	3.10	12.4	18 28.7	20 6 36.3	-1 50.6	+0.3216	0.5464	+0.0152	+36	-16
$\rho^1$ Sagittarii	4	+3.24	+15.6	-18 3.5	21 6 57.2	-2 16.0	+0.6696	0.5446	+0.0516	+67	+4
$\rho^2$ Sagittarii	5½	3.25	15.5	18 30.9	7 1.3	-2 12.0	+1.1800	0.5446	0.0516	+72	+45
$\epsilon^1$ Sagittarii	6	3.25	17.1	16 33.0	16 15.9	+6 45.1	-0.4604	0.5441	0.0649	-3	-65
$\epsilon^2$ Sagittarii	5	3.26	17.2	16 23.2	17 8.8	+7 36.4	-0.5825	0.5440	0.0662	-10	-76
$\delta$ Sagittarii	5½	3.27	18.3	15 47.4	22 0 42.9	-9 3.8	-0.7003	0.5432	0.0771	-16	-90
$\beta$ Capricorni	3	+3.28	+19.5	-15 8.2	12 3.7	+1 55.7	-0.4631	0.5419	+0.0921	0	-65
B. A. C. 7063	6	3.31	19.9	15 26.0	17 1.8	+6 44.5	+0.3393	0.5413	0.0985	+46	-15
B. A. C. 7087	6	3.30	20.3	14 6.7	18 35.3	+8 15.2	-0.9679	0.5411	0.1009	-31	-90
$\tau^1$ Capricorni	5½	3.30	20.1	15 32.3	20 7.6	+9 44.5	+0.7667	0.5409	0.1023	+75	+10
$\tau^2$ Capricorni	5	3.30	20.3	15 21.0	21 5.1	+10 40.3	+0.6559	0.5407	0.1035	+71	+3
Lalande 40522	6	+3.32	+21.2	-14 55.2	23 6 44.6	-3 58.1	+1.2382	0.5399	+0.1153	+75	+50
8 Aquarii	6	3.31	21.3	13 29.3	7 22.1	-3 21.6	-0.2686	0.5399	0.1157	+13	-51
9 Aquarii	6	3.32	21.2	13 58.2	7 58.0	-2 47.0	+0.3329	0.5396	0.1166	+47	-16
18 Aquarii	6	3.31	21.9	13 21.8	19 28.6	+8 22.4	+1.0772	0.5383	0.1293	+77	+32
$\lambda$ Capricorni	5½	3.30	22.6	11 53.3	24 6 42.4	-4 44.4	+0.9665	0.5376	0.1404	+78	+22
B. A. C. 7620	6	+3.29	+22.8	-10 50.7	10 16.7	-1 16.6	+0.3293	0.5370	+0.1434	+50	-16
$\theta$ Aquarii	4½	3.27	23.0	8 20.9	22 0.2	+10 5.6	-0.6655	0.5363	0.1531	-5	-84
B. A. C. 7774	6	3.27	23.0	9 36.4	22 1.4	+10 6.7	+0.7129	0.5363	0.1531	+81	+6
$\rho$ Aquarii	5½	3.27	23.0	8 23.4	23 42.5	+11 44.7	-0.3572	0.5362	0.1545	+12	-56
Lalande 43974	6	3.25	23.0	7 7.9	25 5 19.0	-6 48.9	-0.8551	0.5357	0.1583	-16	-90
67 Aquarii	6	+3.24	+23.0	-7 33.5	11 21.2	-0 57.7	+0.5812	0.5356	+0.1622	+72	-2
B. A. C. 8094	5½	3.21	22.4	4 6.9	26 3 43.0	-9 5.6	-0.4337	0.5358	0.1708	+10	-62
11 Piscium	6½	3.19	21.9	2 24.9	10 43.2	-2 18.2	-1.0693	0.5362	0.1733	-30	-90
14 Piscium	6	3.18	21.7	-1 52.5	13 4.9	-0 0.8	-1.2414	0.5362	0.1740	-47	-90
44 Piscium	6	3.10	19.3	+1 18.5	27 14 43.6	+0 50.8	-0.1393	0.5373	0.1772	+27	-43
B. A. C. 237	6½	+3.04	+17.9	+2 46.0	28 3 29.9	-10 46.6	+0.5564	0.5425	+0.1755	+72	-3
73 Piscium	6½	3.03	16.6	5 2.6	10 7.1	-4 21.9	-0.7127	0.5440	0.1738	-5	-85
77 Piscium	6	3.02	16.8	4 18.1	10 34.9	-3 54.9	+0.1543	0.5445	0.1734	+43	-25
$\epsilon$ Piscium	5½	3.02	16.4	5 2.8	11 49.9	-2 42.3	-0.4200	0.5448	0.1731	+11	-60
B. A. C. 410	6	3.01	15.2	6 48.9	18 51.0	+4 5.4	-1.0882	0.5469	0.1703	-31	-84
96 Piscium	6½	+2.97	+14.8	+6 42.2	21 47.6	+6 56.4	-0.4712	0.5478	+0.1688	+9	-63
$\mu$ Piscium	5	2.95	15.1	5 33.2	22 19.5	+7 27.3	+0.8362	0.5490	0.1687	+90	+14
$\sigma$ Piscium	4½	2.96	13.4	8 34.9	29 5 34.0	-9 32.2	-1.1577	0.5508	0.1645	-38	-82
$\xi^1$ Ceti	4½	2.87	11.6	8 18.6	18 32.9	+3 1.2	+1.2078	0.5560	0.1552	+90	+46
$\xi$ Arietis	5½	2.85	10.3	10 5.5	30 0 0.0	+8 17.5	+0.1729	0.5581	0.1509	+45	-21
B. A. C. 755	6	+2.84	+10.2	+10 2.9	0 53.6	+9 9.4	+0.3526	0.5586	+0.1501	+56	-11
31 Arietis	5½	2.84	8.9	11 57.1	5 22.9	-10 30.4	-0.9759	0.5603	0.1461	-23	-78
B. A. C. 830	6	2.78	9.0	10 15.1	8 5.3	-7 53.4	+1.1923	0.5618	0.1433	+90	+46
38 Arietis	5	2.80	8.3	11 57.8	9 11.0	-6 50.0	-0.4403	0.5623	0.1421	+10	-57
Lalande 5725	6	+2.73	+6.5	+12 45.0	18 49.2	+2 28.4	+0.0606	0.5666	+0.1313	+38	-25
SEPTEMBER.											
48 Tauri	6	+2.44	+0.6	+15 6.7	1 0 54.4	+7 29.4	+0.9616	0.5821	+0.0892	+90	+32
$\gamma$ Tauri	4	2.43	+0.4	15 20.9	2 36.0	+9 7.3	+0.8686	0.5829	0.0862	+90	+26
$\delta^1$ Tauri	4	2.44	-0.5	17 16.3	3 53.4	+10 21.9	-0.9961	0.5835	0.0842	-26	-73
63 Tauri	6	+2.43	-0.3	+16 30.5	4 6.5	+10 34.4	-0.1948	0.5835	+0.0841	+23	-35
$\delta^2$ Tauri	5½	+2.43	-0.5	+17 10.6	4 22.8	+10 50.2	-0.8559	0.5839	+0.0827	-16	-73

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## SEPTEMBER.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\pi'$	$\gamma'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
70 Tauri	6 $\frac{1}{2}$	+2.40	- 0.1	+15 40.6	1 5 3.1	+11 29.0	+0.7360	0.5839	+0.0823	+90	+18
71 Tauri	6	2.38	0.1	15 21.4	5 21.7	+11 46.9	+1.0897	0.5841	0.0821	+90	+43
75 Tauri	6	2.39	0.5	16 6.1	6 13.9	-11 22.8	+0.3960	0.5845	0.0806	+60	- 1
$\theta$ Tauri	4	2.38	0.4	15 42.4	6 17.3	-11 19.5	+0.8058	0.5845	0.0804	+90	+23
$\theta$ Tauri	4	2.38	0.4	15 36.9	6 19.8	-11 17.1	+0.9030	0.5846	0.0804	+90	+29
80 Tauri	6 $\frac{1}{2}$	+2.36	- 0.4	+15 23.1	6 57.2	-10 41.1	+1.1880	0.5848	+0.0790	+90	+54
B. A. C. 1391	5	2.37	0.6	15 56.6	7 7.0	-10 31.7	+0.6296	0.5848	0.0790	+82	+12
81 Tauri	6 $\frac{1}{2}$	2.36	0.4	15 26.5	7 10.0	-10 28.8	+1.1466	0.5848	0.0788	+90	+49
85 Tauri	6	2.36	0.6	15 36.2	7 40.0	- 9 59.9	+1.0205	0.5855	0.0776	+90	+38
$\alpha$ Tauri	1	2.35	1.1	16 16.7	9 21.3	- 8 22.4	+0.4586	0.5857	0.0754	+65	+ 3
$\alpha$ Tauri	5	+2.31	- 1.1	+15 34.3	10 43.0	- 7 3.7	+1.2814	0.5870	+0.0724	+90	+72
$\alpha$ Tauri	5	2.31	1.1	15 41.3	10 45.7	- 7 1.1	+1.1655	0.5870	0.0724	+90	+52
B. A. C. 1526	5 $\frac{1}{2}$	2.24	2.8	16 58.3	18 14.3	+ 0 10.6	+0.3432	0.5901	0.0595	+56	- 2
$m$ Tauri	5 $\frac{1}{2}$	2.21	4.0	18 29.3	22 19.1	+ 4 6.2	-0.9736	0.5917	0.0519	-25	-72
111 Tauri	5 $\frac{1}{2}$	2.10	4.5	17 16.5	2 5 16.5	+10 47.6	+0.5701	0.5946	0.0386	+75	+13
115 Tauri	6	+2.10	- 4.8	+17 51.7	6 23.3	+11 51.9	+0.0169	0.5951	+0.0357	+35	-18
117 Tauri	6 $\frac{1}{2}$	2.07	4.7	17 8.5	6 45.1	-11 47.2	+0.7607	0.5953	0.0353	+90	+24
119 Tauri	5	2.08	5.4	18 30.3	8 25.1	-10 11.0	-0.5658	0.5958	0.0318	+ 2	-55
B. A. C. 1728	6	2.05	4.9	16 58.1	8 27.6	-10 8.6	+0.9915	0.5958	0.0318	+90	+40
120 Tauri	6	2.07	5.5	18 27.4	8 57.2	- 9 40.1	-0.4909	0.5961	0.0311	+ 6	-50
122 Tauri	6	+2.03	- 5.2	+16 58.1	10 24.4	- 8 16.3	+1.0515	0.5965	+0.0277	+90	+45
127 Tauri	6 $\frac{1}{2}$	2.02	6.1	18 55.4	12 43.5	- 6 2.6	-0.8688	0.5971	0.0235	-17	-71
130 Tauri	6	1.97	6.1	17 41.0	14 34.3	- 4 16.1	+0.4265	0.5980	+0.0197	+63	+ 6
71 Orionis	6	1.83	7.9	19 11.5	3 1 30.7	+ 6 14.8	-0.9991	0.6008	-0.0027	-27	-71
23 Geminorum	6 $\frac{1}{2}$	1.69	8.0	16 53.4	9 58.2	- 9 37.6	+1.2224	0.6025	0.0198	+90	+64
26 Geminorum	5 $\frac{1}{2}$	+1.68	- 8.5	+17 45.3	12 28.8	- 7 12.9	+0.2961	0.6027	-0.0253	+53	- 1
51 Geminorum	5 $\frac{1}{2}$	1.49	9.2	16 21.0	4 0 45.3	+ 4 34.6	+1.2374	0.6036	0.0504	+90	+63
$\lambda$ Geminorum	4	1.47	9.5	16 44.7	2 37.1	+ 6 22.0	+0.7449	0.6036	0.0542	+90	+22
W. vii. 685	6	1.39	10.0	17 19.7	8 1.7	+11 33.8	-0.1581	0.6035	0.0647	+25	-30
68 Geminorum	5 $\frac{1}{2}$	1.37	9.8	16 4.2	8 46.0	-11 43.7	+1.0483	0.6035	0.0664	+90	+42
$f$ Geminorum	6	+1.37	-10.4	+17 55.9	11 3.4	- 9 31.7	-0.9663	0.6032	-0.0707	-24	-72
1 Cancri	6	1.27	10.2	16 5.6	18 2.2	- 2 49.4	+0.3256	0.6029	0.0842	+55	- 5
5 Cancri	6 $\frac{1}{2}$	1.26	10.5	16 46.1	19 49.0	- 1 6.8	-0.5016	0.6025	0.0877	+ 6	-55
29 Cancri	6	1.12	10.3	14 35.2	5 6 40.1	+ 9 18.8	+0.6137	0.6005	0.1073	+79	+ 9
$\xi$ Leonis	5 $\frac{1}{2}$	0.90	9.9	11 48.3	6 8 22.1	+10 1.5	+0.0945	0.5933	0.1468	+40	-24
$\alpha$ Leonis	3 $\frac{1}{2}$	+0.88	- 9.7	+10 24.7	12 11.0	-10 18.2	+0.9139	0.5920	-0.1513	+90	+23
MERCURY				+ 7 6.6	7 10 11.6	+10 53.3	+0.6198	0.5878	0.1781	+79	+ 2
NEW MOON.											
$\eta$ Virginis	3 $\frac{1}{2}$	0.87	5.0	- 0 1.8	9 8 33.3	+ 7 36.3	-0.7004	0.5680	0.1865	- 5	-88
38 Virginis	6	+0.97	- 4.0	- 2 55.8	23 33.6	- 1 54.2	-0.5130	0.5640	-0.1818	+ 6	-68
$k$ Virginis	6	0.99	3.6	3 11.5	10 2 29.2	+ 0 55.3	-0.7743	0.5635	0.1804	-10	-90
$\theta$ Virginis	4 $\frac{1}{2}$	1.03	3.5	4 55.6	7 9.8	+ 5 26.5	+0.1700	0.5626	0.1782	+44	-25
$\iota$ Virginis	6	1.11	2.6	5 39.7	17 14.4	- 8 49.2	-0.8347	0.5604	0.1718	-14	-90
81 Virginis	5 $\frac{1}{2}$	1.16	2.5	7 17.2	19 48.3	- 6 20.5	+0.4135	0.5598	0.1697	+58	-12
$m$ Virginis	5 $\frac{1}{2}$	+1.18	- 2.5	- 8 7.4	21 39.2	- 4 33.3	+0.9701	0.5595	-0.1683	+82	+22
B. A. C. 4647	6	1.22	1.6	7 29.5	11 3 49.6	+ 1 24.8	-0.7112	0.5582	0.1633	- 7	-90
W. xiii. 825	6	1.24	1.9	8 59.6	4 11.0	+ 1 45.5	+0.7986	0.5582	0.1632	+81	+11
94 Virginis	6	1.27	1.3	8 20.5	9 2.5	+ 6 27.3	-0.6647	0.5575	0.1589	- 5	-84
95 Virginis	6	1.29	1.4	8 45.8	9 14.4	+ 6 38.8	-0.2547	0.5575	0.1586	+18	-50
96 Virginis	6 $\frac{1}{2}$	+1.31	- 1.5	- 9 47.4	10 17.1	+ 7 39.4	+0.6563	0.5573	-0.1577	+77	+ 2
$\kappa$ Virginis	4 $\frac{1}{2}$	1.31	1.2	9 44.4	12 5.1	+ 9 23.8	+0.3216	0.5571	0.1559	+51	-17
2 Libræ	6	1.37	- 1.0	11 11.3	16 57.2	- 9 53.8	+1.0972	0.5564	0.1509	+79	+33
$\xi$ Libræ	6	1.51	+ 0.6	11 26.8	12 7 22.1	+ 4 2.6	-0.7091	0.5547	0.1353	-10	-90
$\alpha$ Libræ	6	1.70	1.3	14 43.4	20 42.6	- 7 3.2	+1.1082	0.5534	0.1185	+76	+35
$\gamma$ Libræ	4 $\frac{1}{2}$	+1.75	+ 2.3	-14 24.3	13 2 34.3	- 1 22.9	+0.0965	0.5530	-0.1107	+32	-29
$\eta$ Libræ	6	+1.81	+ 2.6	-15 18.4	6 34.6	+ 2 29.5	+0.6342	0.5525	-0.1052	+69	+ 2

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$y'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
49 Libræ	6	+1.90	+3.3	-16 11.5	13 14 14.0	+ 9 53.9	+0.8218	0.5518	-0.0950	+74	+13
♄ Ophiuchi	5	2.06	5.3	16 21.5	14 4 43.1	- 0 5.4	-0.2154	0.5508	0.0737	+11	-47
♏ Scorpii	5	2.13	5.5	17 31.0	9 37.0	+ 4 38.9	+0.7003	0.5503	0.0662	+71	+ 6
B. A. C. 6060	6	2.52	9.7	18 46.6	15 20 54.2	- 9 12.3	+0.6995	0.5476	0.0121	+68	+ 6
6 Sagittarii	6	2.51	10.8	17 8.8	23 33.5	- 6 38.1	-1.1243	0.5475	-0.0075	-53	-90
B. A. C. 6294	6	+2.67	+12.2	-18 28.7	16 13 56.7	+ 7 17.5	+0.3943	0.5461	+0.0144	+41	-12
♐ Sagittarii	4	2.87	15.1	18 3.5	17 14 16.1	+ 6 50.5	+0.7308	0.5436	0.0508	+72	+ 8
♐ Sagittarii	5½	2.88	14.9	18 31.0	14 23.2	+ 6 54.5	+1.2422	0.5436	0.0508	+72	+55
♐ Sagittarii	6	2.91	16.6	16 33.0	23 35.2	- 8 8.0	-0.4023	0.5425	0.0648	0	-61
♐ Sagittarii	5	2.92	16.9	16 23.2	18 0 28.2	- 7 16.6	-0.5241	0.5423	0.0661	- 7	-71
♐ Sagittarii	5½	+2.96	+17.8	-15 47.4	8 3.1	+ 0 4.1	-0.6457	0.5416	+0.0762	-13	-84
♑ Capricorni	3	3.02	18.9	15 8.2	19 25.0	+11 4.7	-0.4127	0.5401	0.0918	+ 2	-61
B. A. C. 7063	6	3.07	19.2	15 26.0	19 0 23.6	- 8 6.0	+0.3849	0.5398	0.0992	+49	-13
B. A. C. 7087	6	3.06	19.7	14 6.7	1 57.4	- 6 35.0	-0.9202	0.5395	0.0998	-27	-90
♑ Capricorni	5½	3.09	19.3	15 32.4	3 29.7	- 5 5.7	+0.8134	0.5392	0.1020	+75	+13
♑ Capricorni	5	+3.09	+19.5	-15 21.1	4 27.2	- 4 9.9	+0.7029	0.5392	+0.1033	+74	+ 6
8 Aquarii	6	3.13	20.8	13 29.4	14 45.0	+ 5 48.9	-0.2278	0.5386	0.1153	+15	-48
9 Aquarii	6	3.14	20.7	13 58.3	15 21.0	+ 6 23.7	+0.3728	0.5386	0.1157	+50	-14
18 Aquarii	6	3.19	21.4	13 21.8	20 2 51.8	- 6 26.7	+1.1097	0.5374	0.1285	+77	+34
♑ Capricorni	5½	3.23	22.2	11 53.3	14 4.7	+ 4 25.7	+0.9915	0.5371	0.1396	+78	+24
B. A. C. 7620	6	+3.25	+22.5	-10 50.7	17 38.5	+ 7 52.9	+0.3539	0.5369	+0.1432	+52	-15
♒ Aquarii	4½	3.27	23.2	8 20.9	21 5 19.6	- 4 47.4	-0.6413	0.5369	0.1527	- 4	-81
B. A. C. 7774	6	3.27	23.0	9 36.4	5 20.9	- 4 46.2	+0.7340	0.5369	0.1527	+80	+ 7
♒ Aquarii	5½	3.27	23.1	8 23.4	7 1.4	- 3 8.7	-0.3359	0.5370	0.1542	+13	-55
Lalande 43974	6	3.29	23.4	7 7.9	12 36.0	+ 2 15.7	-0.8322	0.5371	0.1585	-15	-90
67 Aquarii	6	+3.30	+23.2	- 7 33.5	18 36.0	+ 8 4.7	+0.5933	0.5373	+0.1625	+73	- 2
B. A. C. 8094	5½	3.33	23.2	4 6.9	22 10 49.7	- 0 11.4	-0.4208	0.5384	0.1712	+11	-61
11 Piscium	6½	3.35	23.0	2 24.9	17 45.6	+ 6 31.8	-1.0566	0.5392	0.1740	-29	-90
14 Piscium	6	3.36	22.9	- 1 52.5	20 5.7	+ 8 47.5	-1 2274	0.5395	0.1748	-45	-90
44 Piscium	6	3.40	21.2	+ 1 18.6	23 21 24.0	+ 9 18.8	-0.1402	0.5444	0.1784	-27	-43
B. A. C. 237	6½	+3.41	+19.9	+ 2 46.0	24 9 58.7	- 2 30.3	+0.5491	0.5476	+0.1769	+71	- 4
73 Piscium	6½	3.43	19.0	5 2.6	16 29.4	+ 3 47.8	-0.7153	0.5496	0.1751	- 5	-85
77 Piscium	6	3.41	19.0	4 18.1	16 56.8	+ 4 14.4	+0.1479	0.5498	0.1751	+43	-26
♓ Piscium	5½	3.42	18.8	5 2.8	18 10.7	+ 5 25.9	-0.4226	0.5502	0.1747	+11	-60
B. A. C. 410	6	3.44	17.7	6 48.9	25 1 5.0	-11 53.1	-1.0899	0.5522	0.1718	-31	-84
96 Piscium	6½	+3.43	+17.3	+ 6 42.3	3 58.7	- 9 5.0	-0.4788	0.5535	+0.1705	+ 8	-64
♓ Piscium	5	3.41	17.4	5 33.2	4 30.0	- 8 34.7	+0.8226	0.5539	0.1701	+90	+13
♓ Piscium	4½	3.46	16.1	8 35.0	11 37.7	- 1 41.0	-1.1612	0.5560	0.1660	-38	-82
♋ Ceti	4½	3.42	14.0	8 18.6	26 0 94.7	+10 40.4	+1.1912	0.5613	0.1568	+90	+44
♋ Arietis	5½	3.41	12.9	10 5.5	5 47.3	- 8 7.8	+0.1617	0.5636	0.1522	+44	-22
B. A. C. 755	6	+3.41	+12.7	+10 2.9	6 40.1	- 7 16.8	+0.3406	0.5637	+0.1512	+55	-12
31 Arietis	5½	3.43	11.6	11 57.2	11 5.9	- 3 0.0	-0.9822	0.5653	0.1471	-23	-78
B. A. C. 830	6	3.37	11.5	10 15.2	13 46.3	- 0 25.1	+1.1752	0.5666	0.1442	+90	+44
38 Arietis	5	3.41	10.8	11 57.9	14 51.2	+ 0 37.5	-0.4487	0.5670	0.1431	+10	-58
Lalande 5725	6	3.37	8.9	12 45.0	27 0 23.2	+ 9 49.8	+0.0501	0.5709	0.1326	+37	-26
48 Tauri	6	+3.18	+ 2.5	+15 6.7	28 6 18.3	- 9 19.4	+0.9557	0.5828	+0.0898	+90	+32
γ Tauri	4	3.18	2.2	15 20.9	7 59.9	- 7 41.5	+0.8610	0.5835	0.0866	+90	+25
♉ Tauri	4	3.20	1.3	17 16.3	9 17.2	- 6 27.1	-1.0044	0.5841	0.0847	-26	-73
63 Tauri	6	3.18	1.4	16 30.5	9 30.3	- 6 14.5	-0.2036	0.5843	0.0838	-23	-35
♉ Tauri	5½	3.19	1.3	17 10.6	9 46.7	- 5 58.7	-0.8658	0.5844	0.0835	-16	-73
70 Tauri	6½	+3.14	+ 1.5	+15 40.6	10 26.8	- 5 20.0	+0.7288	0.5847	+0.0821	+90	+18
71 Tauri	6	3.14	1.5	15 21.4	10 45.4	- 5 2.1	+1.0827	0.5847	0.0818	+90	+43
75 Tauri	6	3.14	1.1	16 6.1	11 37.8	- 4 11.6	+0.3898	0.5851	0.0804	+59	- 2
♉ Tauri	4	3.13	1.2	15 42.4	11 41.1	- 4 8.5	+0.8002	0.5851	0.0802	+90	+22
♉ Tauri	4	3.13	1.3	15 36.9	11 43.6	- 4 6.1	+0.8976	0.5851	0.0802	+90	+29
80 Tauri	6½	+3.12	+ 1.1	+15 23.1	12 21.2	- 3 29.8	+1.1830	0.5851	+0.0795	+90	+53
B. A. C. 1391	5	+3.13	+ 1.0	+15 56.6	12 30.9	- 3 20.5	+0.6223	0.5855	+0.0786	+81	+12

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1855.0.		Apparent Declination	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$y'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
81 Tauri	6 $\frac{1}{2}$	+3.12	+ 1.1	+15 26.5	28 12 33.8	- 3 17.7	+1.1402	0.5855	+0.0787	+90	+49
85 Tauri	6	3.12	1.0	15 36.2	13 4.1	- 2 48.5	+1.0137	0.5855	0.0782	+90	+37
$\alpha$ Tauri	1	3.12	0.5	16 16.7	14 45.5	- 1 10.9	+0.4511	0.5861	0.0750	+64	+ 2
$\sigma^1$ Tauri	5	3.08	0.3	15 34.3	16 7.5	+ 0 8.1	+1.2761	0.5864	0.0728	+90	+69
$\sigma^2$ Tauri	5	3.09	+ 0.3	15 41.3	16 10.3	+ 0 10.7	+1.1598	0.5864	0.0728	+90	+51
B. A. C. 1526	5 $\frac{1}{2}$	+3.04	- 1.6	+16 58.3	23 40.6	+ 7 24.2	+0.3393	0.5889	+0.0590	+56	- 2
$m$ Tauri	5 $\frac{1}{2}$	3.01	2.9	18 29.4	29 3 47.1	+11 21.5	-0.9861	0.5899	0.0514	-26	-72
111 Tauri	5 $\frac{1}{2}$	2.89	3.6	17 16.5	10 48.1	- 5 53.5	+0.5697	0.5920	0.0381	+75	+12
115 Tauri	6	2.90	4.1	17 51.7	11 55.7	- 4 48.4	+0.0119	0.5923	0.0361	+35	-18
117 Tauri	6 $\frac{1}{2}$	2.87	3.9	17 8.5	12 17.7	- 4 27.2	+0.7599	0.5923	0.0356	+90	+24
119 Tauri	5	+2.88	- 4.6	+18 30.3	13 58.9	- 2 49.9	-0.5742	0.5924	+0.0321	+ 2	-56
B. A. C. 1728	6	2.84	4.2	16 58.1	14 1.3	- 2 47.6	+0.9938	0.5924	0.0321	+90	+40
120 Tauri	6	2.87	4.8	18 27.4	14 31.2	- 2 18.8	-0.5080	0.5926	0.0308	+ 6	-51
122 Tauri	6	2.82	4.5	16 58.1	15 59.5	- 0 53.8	+1.0529	0.5929	0.0282	+90	+46
127 Tauri	6 $\frac{1}{2}$	2.82	5.6	18 55.4	18 20.4	+ 1 21.7	-0.8774	0.5932	0.0239	-18	-71
130 Tauri	6	+2.77	- 5.6	+17 41.0	20 12.7	+ 3 9.7	+0.4242	0.5938	+0.0202	+62	+ 6
71 Orionis	6	2.65	7.8	19 11.5	30 7 19.5	-10 9.0	-1.0109	0.5953	-0.0019	-28	-71
23 Geminorum	6 $\frac{1}{2}$	2.49	8.2	16 53.4	15 56.5	- 1 51.8	+1.2308	0.5960	0.0123	+90	+66
26 Geminorum	5 $\frac{1}{2}$	+2.47	- 8.9	+17 45.3	18 30.3	+ 0 36.0	+0.2975	0.5962	-0.0248	+53	- 1

## OCTOBER.

51 Geminorum	5 $\frac{1}{2}$	+2.24	-10.1	+16 21.0	1 7 4.1	-11 19.2	+1.2531	0.5957	-0.0493	+90	+66
$\lambda$ Geminorum	4	2.22	10.5	16 44.7	8 58.7	- 9 29.0	+0.7539	0.5957	0.0531	+90	+22
W. vii. 685	6	2.14	11.2	17 19.7	14 31.6	- 4 8.9	-0.1601	0.5950	0.0640	+25	-30
68 Geminorum	5 $\frac{1}{2}$	2.11	10.8	16 4.2	15 17.3	- 3 24.9	+1.0632	0.5947	0.0649	+90	+43
$f$ Geminorum	6	+2.10	-11.7	+17 55.9	17 38.4	- 1 9.3	-0.9786	0.5946	-0.0699	-25	-72
1 Cancri	6	1.98	11.7	16 5.6	2 0 49.0	+ 5 45.0	+0.3315	0.5934	0.0828	+55	- 5
5 Cancri	6 $\frac{1}{2}$	1.96	12.1	16 46.1	2 38.9	+ 7 30.7	-0.5048	0.5932	0.0863	+ 6	-55
29 Cancri	6	1.79	12.1	14 35.2	13 49.6	- 5 44.0	+0.6237	0.5909	0.1054	+81	+ 9
$\xi$ Leonis	5 $\frac{1}{2}$	1.43	11.9	11 48.3	3 16 19.3	- 4 13.6	+0.0992	0.5838	0.1439	+40	-24
$\sigma$ Leonis	3 $\frac{1}{2}$	+1 41	-11.5	+10 24.7	20 14.9	- 0 26.5	+0.9298	0.5828	-0.1488	+90	+24
B. A. C. 3345	6	1.34	11.9	11 57.4	22 56.8	+ 2 9.4	-1.0375	0.5820	0.1521	-28	-78
B. A. C. 3398	6	1.31	11.3	9 28.4	4 2 46.1	+ 5 50.4	+0.8812	0.5808	0.1562	+90	+20
A Leonis	4 $\frac{1}{2}$	1.26	11.3	10 33.4	7 40.7	+10 34.4	-0.9926	0.5793	0.1613	-24	-80
44 Leonis	6	1.20	10.7	9 21.9	15 10.7	- 6 11.8	-1.0269	0.5776	0.1679	-26	-81
48 Leonis	5 $\frac{1}{2}$	+1.16	-10.2	+ 7 32.6	19 21.1	- 2 10.3	+0.1062	0.5763	-0.1712	+41	-27
37 Sextantis	6 $\frac{1}{2}$	1.13	9.9	6 58.5	5 0 16.8	+ 2 34.9	-0.1720	0.5746	0.1747	+25	-43
38 Sextantis	6	1.13	9.8	6 57.0	0 49.1	+ 3 6.0	-0.2395	0.5746	0.1753	+21	-47
56 Leonis	6 $\frac{1}{2}$	1.10	9.6	6 47.8	4 38.2	+ 6 47.0	-0.7596	0.5736	0.1777	- 8	-75
$c$ Leonis	5 $\frac{1}{2}$	1.09	9.4	6 43.0	6 43.0	+ 8 47.4	-1.0486	0.5729	0.1788	-28	-84
80 Leonis	6 $\frac{1}{2}$	+1.05	- 8.4	+ 4 29.3	17 49.7	- 4 29.1	-0.8058	0.5703	-0.1837	-11	-86
$\tau$ Leonis	5	1.04	8.2	3 29.2	18 45.7	- 3 35.1	+0.0389	0.5701	0.1839	+37	-32
89 Leonis	6	1.04	8.1	3 41.9	21 38.2	- 0 48.6	-0.7047	0.5693	0.1847	- 5	-86
$\beta$ Virginis	3 $\frac{1}{2}$	1.02	7.4	+ 2 24.7	6 4 53.4	+ 6 11.5	-0.7437	0.5679	0.1861	- 7	-83
MERCURY				- 1 48.8	7 2 44.6	+ 3 18.0	-0.4887	0.4968	0.1520	+ 6	-65
NEW MOON.											
$\kappa$ Virginis	4 $\frac{1}{2}$	+1.17	- 0.7	- 9 44.4	8 21 40.0	- 3 13.3	+0.2984	0.5603	-0.1569	+49	-18
2 Libræ	6	1.16	- 0.4	11 11.3	9 2 29.8	+ 1 26.9	+1.0703	0.5598	0.1520	+79	+30
$\zeta$ Libræ	6	1.29	+ 1.3	11 25.8	16 45.8	- 8 45.7	-0.7364	0.5591	0.1373	-12	-90
$\sigma^2$ Libræ	6	+1.36	+ 2.2	-14 43.4	10 5 56.2	+ 3 58.4	+1.0661	0.5584	-0.1200	+76	+31
$\gamma$ Libræ	4 $\frac{1}{2}$	1.43	3.1	14 24.2	11 42.9	+ 9 33.6	+0.0552	0.5582	0.1123	+30	-31
$\eta$ Libræ	6	1.45	3.4	15 18.3	15 39.7	-10 37.5	+0.5883	0.5577	0.1067	+65	- 1
$\theta$ Libræ	4 $\frac{1}{2}$	1.47	3.7	16 23.4	20 8.8	- 6 17.3	+1.2865	0.5577	0.1008	+74	+64
49 Libræ	6	1.51	4.0	-16 11.5	23 12.4	- 3 19.8	+0.7764	0.5572	0.0963	+74	+10
$\phi$ Ophiuchi	5	+1.66	+ 6.0	-16 21.5	11 13 28.4	+10 27.9	-0.2642	0.5559	-0.0746	+ 8	-51
24 Scorpii	5	+1.68	+ 6.1	-17 31.0	18 18.1	- 8 52.1	+0.6479	0.5556	-0.0677	+66	+ 2

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N.	S.		
		$\Delta\alpha$	$\Delta\delta$										
B. A. C. 6060	6	+2.00	+ 9.8	-18 46.6	13 5 8.3	+ 0 49.6	+0.6345	0.5507	-0.0126	+61	+ 2		
6 Sagittarii	6	2.06	10.7	17 8.8	7 46.1	+ 3 22.3	-1.1820	0.5503	-0.0080	-59	-90		
B. A. C. 6294	6	2.14	11.8	18 28.7	22 2.0	- 6 49.4	+0.3250	0.5482	+0.0141	+36	-16		
$\rho^1$ Sagittarii	4	2.35	14.6	18 3.6	14 22 15.2	- 7 22.5	+0.6615	0.5434	0.0507	+66	+ 4		
$\rho^2$ Sagittarii	5½	2.34	14.4	18 31.0	22 19.2	- 7 18.7	+1.1700	0.5434	0.0507	+72	+44		
$\epsilon^1$ Sagittarii	6	+2.43	+16.0	-16 33.0	15 7 33.9	+ 1 38.5	-0.4701	0.5414	+0.0645	- 4	-66		
$\epsilon^2$ Sagittarii	5	2.43	16.3	16 23.2	8 26.8	+ 2 29.7	-0.5936	0.5413	0.0658	-11	-78		
$\gamma$ Sagittarii	5½	2.49	17.1	15 47.4	16 2.3	+ 9 51.0	-0.7171	0.5401	0.0760	-17	-90		
$\beta$ Capricorni	3	2.58	18.3	15 8.2	16 3 26.1	- 3 6.4	-0.4846	0.5380	0.0914	- 2	-67		
B. A. C. 7063	6	2.62	18.6	15 26.0	8 25.8	+ 1 44.0	+0.3149	0.5374	0.0978	+44	-17		
B. A. C. 7087	6	+2.63	+19.1	-14 6.7	10 0.1	+ 3 15.5	-0.9926	0.5374	+0.0995	-33	-90		
$\gamma^1$ Capricorni	5½	2.63	18.7	15 32.4	11 32.8	+ 4 45.3	+0.7439	0.5371	0.1016	+75	+ 8		
$\gamma^2$ Capricorni	5	2.64	18.8	15 21.1	12 30.6	+ 5 41.3	+0.6316	0.5371	0.1028	+68	+ 1		
Lalande 40522	6	2.72	19.8	14 55.3	22 14.0	- 8 53.2	+1.2098	0.5358	0.1138	+75	+46		
8 Aquarii	6	2.73	20.2	13 29.4	22 51.6	- 8 16.7	-0.2959	0.5356	0.1147	+11	-53		
9 Aquarii	6	+2.72	+20.1	-13 58.3	23 27.7	- 7 41.7	+0.3033	0.5353	+0.1158	+45	-17		
18 Aquarii	6	2.79	20.8	13 21.9	17 11 3.0	+ 3 32.3	+1.0450	0.5345	0.1279	+77	+29		
$\lambda$ Capricorni	5½	2.88	21.5	11 53.3	22 20.4	- 9 30.9	+0.9301	0.5339	0.1390	+78	+20		
B. A. C. 7620	6	2.91	21.9	10 50.7	18 1 55.5	- 6 2.3	+0.2920	0.5335	0.1426	+48	-18		
$\theta$ Aquarii	4½	3.01	22.2	8 20.9	13 41.0	+ 5 21.8	-0.6998	0.5337	0.1527	- 7	-89		
B. A. C. 7774	6	+3.00	+22.4	- 9 36.4	13 42.2	+ 5 22.9	+0.6763	0.5337	+0.1527	+79	+ 3		
$\rho$ Aquarii	5½	3.02	22.7	8 23.4	15 23.4	+ 7 1.1	-0.3906	0.5338	0.1537	+10	-59		
Lalande 43974	6	3.06	23.0	7 7.9	20 59.8	-11 32.7	-0.8849	0.5345	0.1581	-18	-90		
67 Aquarii	6	3.08	22.9	7 33.5	19 3 1.5	- 5 42.0	+0.5441	0.5345	0.1622	+68	- 4		
B. A. C. 8094	5½	3.19	23.2	4 6.9	19 18.2	+10 5.0	-0.4615	0.5367	0.1711	+ 8	-64		
11 Piscium	6½	+3.25	+23.2	- 2 24.9	20 2 14.5	- 7 11.5	-1.0887	0.5380	+0.1742	-31	-90		
14 Piscium	6	3.26	23.2	- 1 52.5	4 34.4	- 4 55.9	-1.2589	0.5388	0.1753	-49	-90		
44 Piscium	6	3.45	21.4	+ 1 18.6	21 5 47.6	- 4 29.8	-0.1537	0.5457	0.1798	+26	-43		
B. A. C. 237	6½	3.52	20.3	2 46.0	18 15.9	+ 7 34.7	+0.5441	0.5499	0.1786	+71	- 4		
73 Piscium	6½	3.59	19.8	5 2.6	22 0 42.2	-10 11.5	-0.7053	0.5525	0.1771	- 5	-85		
77 Piscium	6	+3.57	+19.6	+ 4 18.1	1 9.4	- 9 45.2	+0.1522	0.5525	+0.1770	+43	-25		
$\epsilon$ Piscium	5½	3.59	19.5	5 2.8	2 22.3	- 8 34.7	-0.4144	0.5533	0.1766	+12	-60		
B. A. C. 410	6	3.64	18.7	6 48.9	9 11.1	- 1 59.3	-1.0683	0.5564	0.1740	-29	-84		
96 Piscium	6½	3.65	18.3	6 42.3	12 2.3	+ 0 46.3	-0.4596	0.5576	0.1727	+ 9	-62		
$\mu$ Piscium	5	3.63	18.1	5 33.2	12 33.1	+ 1 16.1	+0.8337	0.5578	0.1725	+90	+14		
$\sigma$ Piscium	4½	+3.74	+17.2	+ 8 35.0	19 34.0	+ 8 3.0	-1.1293	0.5611	+0.1685	-35	-82		
$\xi^1$ Ceti	4½	3.75	15.0	8 18.7	23 8 7.2	- 3 49.3	+1.2162	0.5666	0.1596	+90	+47		
$\xi$ Arietis	5½	3.77	13.9	10 5.5	13 23.3	+ 1 15.9	+0.2014	0.5692	0.1551	+46	-20		
B. A. C. 755	6	3.77	13.7	10 2.9	14 15.1	+ 2 5.9	+0.3803	0.5698	0.1542	+58	-10		
31 Arietis	5½	3.82	12.9	11 57.2	18 35.2	+ 6 17.0	-0.9276	0.5722	0.1486	-20	-78		
B. A. C. 830	6	+3.78	+12.5	+10 15.2	21 12.2	+ 8 48.4	+1.2117	0.5731	+0.1472	+90	+48		
38 Arietis	5	3.83	12.1	11 57.9	22 15.6	+ 9 49.6	-0.3946	0.5735	0.1461	+13	-54		
Lalande 5725	6	3.84	10.1	12 45.1	24 7 34.6	- 5 11.2	+0.1060	0.5784	0.1349	+41	-23		
48 Tauri	6	3.81	3.3	15 6.8	25 12 47.7	- 1 2.6	+1.0278	0.5911	0.0914	+90	+37		
$\gamma$ Tauri	4	3.81	2.9	15 20.9	14 26.9	+ 0 32.9	+0.9376	0.5920	0.0890	+90	+31		
$\delta^1$ Tauri	4	+3.86	+ 2.2	+17 16.3	15 42.5	+ 1 45.6	-0.9084	0.5920	+0.0863	-19	-73		
63 Tauri	6	3.84	2.2	16 30.5	15 55.3	+ 1 58.0	-0.1136	0.5921	0.0861	+28	-30		
$\delta^2$ Tauri	5½	3.85	2.1	17 10.6	16 11.4	+ 2 13.5	-0.7711	0.5921	0.0858	-10	-73		
70 Tauri	6½	3.80	2.3	15 40.6	16 50.6	+ 2 51.2	+0.8100	0.5923	0.0844	+90	+23		
71 Tauri	6	3.79	2.2	15 21.4	17 8.8	+ 3 8.7	+1.1606	0.5924	0.0839	+90	+50		
75 Tauri	6	+3.81	+ 1.9	+16 6.1	17 59.9	+ 3 57.9	+0.4761	0.5929	+0.0825	+66	+ 3		
$\theta^1$ Tauri	4	3.80	2.0	15 42.4	18 3.2	+ 4 1.0	+0.8810	0.5929	0.0825	+90	+27		
$\theta^2$ Tauri	4	3.79	2.0	15 36.9	18 5.6	+ 4 3.3	+0.9774	0.5929	0.0825	+90	+34		
80 Tauri	6½	3.78	1.9	15 23.1	18 42.2	+ 4 38.6	+1.2601	0.5929	0.0810	+90	+64		
B. A. C. 1391	5	3.79	1.7	15 56.6	18 51.8	+ 4 47.8	+0.7063	0.5929	0.0808	+90	+16		
81 Tauri	6½	+3.78	+ 1.8	+15 26.5	18 54.7	+ 4 50.5	+1.2196	0.5929	+0.0808	+90	+58		
85 Tauri	6	+3.78	+ 1.7	+15 36.2	19 24.2	+ 5 18.9	+1.0942	0.5933	+0.0794	+90	+44		



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.	
		$\Delta\alpha$	$\Delta\delta$									
$\alpha$ Tauri	1	+3.79	+ 1.1	+16° 16.7	d <sup>h</sup> m 25 21 3.4	h m + 6 54.4	+0.5384	0.5936	+0.0770	+72°	+ 7	
$\sigma^2$ Tauri	5	3.76	+ 1.0	15 41.3	22 26.1	+ 8 13.9	+1.2408	0.5942	0.0740	+90	+62	
B. A. C. 1526	5½	3.74	- 1.0	16 58.3	26 5 46.8	- 8 42.1	+0.4327	0.5962	0.0605	+63	+ 3	
$\mu$ Tauri	5½	3.74	2.3	18 29.4	9 48.2	- 4 49.9	-0.8784	0.5969	0.0527	-18	-72	
111 Tauri	5½	3.64	3.6	17 16.5	16 41.0	+ 1 46.9	+0.6699	0.5983	0.0391	+88	+18	
115 Tauri	6	+3.65	- 4.0	+17 51.7	17 47.3	+ 2 50.7	+0.1181	0.5984	+0.0370	+42	-12	
117 Tauri	6½	3.63	3.8	17 8.5	18 9.0	+ 3 11.5	+0.8604	0.5984	0.0366	+90	+31	
119 Tauri	5	3.64	4.6	18 30.3	19 48.2	+ 4 46.9	-0.4623	0.5987	0.0329	+ 8	-47	
B. A. C. 1728	6	3.60	4.3	16 58.1	19 50.7	+ 4 49.3	+1.0950	0.5987	0.0329	+90	+49	
120 Tauri	6	3.64	4.8	18 27.4	20 20.1	+ 5 17.5	-0.3964	0.5987	0.0324	+12	-43	
122 Tauri	6	+3.59	- 4.7	+16 58.1	21 46.8	+ 6 40.8	+1.1537	0.5989	+0.0290	+90	+55	
127 Tauri	6½	3.62	5.7	18 55.4	27 0 5.2	+ 8 53.9	-0.7636	0.5991	0.0246	-10	-71	
130 Tauri	6	3.57	5.9	17 41.0	1 55.7	+10 40.1	+0.5327	0.5994	+0.0207	+72	+12	
71 Orionis	6	3.48	8.5	19 11.5	12 52.7	- 2 48.4	-0.8896	0.5995	-0.0019	-19	-71	
26 Geminorum	5½	3.28	10.3	17 45.2	23 56.3	+ 7 49.3	+0.4193	0.5988	0.0243	+62	+ 5	
$\lambda$ Geminorum	4	+3.06	-12.4	+16 44.7	28 14 19.4	- 2 20.9	+0.8810	0.5965	-0.0527	+90	+30	
W. vii. 685	6	2.98	13.4	17 19.7	19 51.7	+ 2 58.6	-0.0337	0.5950	0.0637	+33	-23	
68 Geminorum	5½	2.95	13.1	16 4.2	20 37.2	+ 3 42.3	+1.1896	0.5947	0.0652	+90	+55	
f Geminorum	6	2.94	14.0	17 55.9	22 58.3	+ 5 58.0	-0.8494	0.5944	0.0694	-15	-72	
1 Cancri	6	2.80	14.3	16 5.6	29 6 9.7	-11 7.0	+0.4604	0.5924	0.0825	+65	+ 2	
5 Cancri	6½	+2.77	-14.6	+16 46.1	8 0.1	- 9 20.8	-0.3761	0.5917	-0.0858	+13	-46	
29 Cancri	6	2.57	15.0	14 35.1	19 15.0	+ 1 28.6	+0.7581	0.5882	0.1047	+90	+17	
$\xi$ Leonis	5½	2.14	15.3	11 48.2	30 22 6.1	+ 3 20.7	+0.2253	0.5778	0.1429	+48	-17	
$\sigma$ Leonis	3½	2.09	14.9	10 24.7	31 2 6.1	+ 7 12.0	+1.0578	0.5763	0.1477	+90	+33	
B. A. C. 3345	6	2.05	15.4	11 57.3	4 51.3	+ 9 51.3	-0.9210	0.5753	0.1509	-19	-78	
B. A. C. 3398	6	+2.00	-14.8	+ 9 28.4	8 45.3	-10 23.0	+1.0079	0.5737	-0.1549	+90	+29	
A Leonis	4½	1.94	15.0	10 33.3	13 46.2	- 5 32.7	-0.8833	0.5719	0.1599	-16	-80	
44 Leonis	6	+1.85	-14.6	+ 9 21.9	21 26.5	+ 1 51.5	-0.9255	0.5692	-0.1667	-19	-81	

## NOVEMBER.

48 Leonis	5 $\frac{1}{2}$	+1.79	-13.9	+ 7 32.6	1 1 42.9	+ 5 58.9	+0.2163	0.5679	-0.1699	+47	-21
37 Sextantis	6 $\frac{1}{2}$	1.73	13.6	6 58.5	6 46.0	+10 51.6	-0.0682	0.5665	0.1734	+31	-37
38 Sextantis	6	1.72	13.6	6 57.0	7 19.2	+11 23.5	-0.1380	0.5663	0.1736	+27	-41
56 Leonis	6 $\frac{1}{2}$	1.68	13.4	6 47.8	11 14.0	- 8 49.7	-0.6671	0.5654	0.1759	- 2	-80
$\epsilon$ Leonis	5 $\frac{1}{2}$	1.66	13.3	6 43.0	13 22.1	- 6 46.0	-0.9614	0.5649	0.1770	-21	-84
80 Leonis	6 $\frac{1}{2}$	+1.56	-11.8	+ 4 29.2	2 0 46.1	+ 4 14.8	-0.7258	0.5619	-0.1820	- 6	-85
$\tau$ Leonis	5	1.55	11.5	3 29.1	1 43.6	+ 5 10.3	+0.1284	0.5615	0.1824	+42	-27
89 Leonis	6	1.53	11.4	3 41.8	4 40.5	+ 8 1.3	-0.6289	0.5611	0.1832	0	-78
$\beta$ Virginis	3 $\frac{1}{2}$	1.47	10.5	2 24.6	12 7.0	- 8 47.2	-0.6730	0.5599	0.1846	- 3	-84
JUPITER				+ 1 53.6	16 12.9	- 4 49.5	-0.8991	0.5586	0.1820	-17	-88
13 Virginis	6 $\frac{1}{2}$	+1.39	- 8.8	- 0 9.0	3 1 4.4	+ 3 44.2	-0.4308	0.5581	-0.1849	+11	-62
$\eta$ Virginis	3 $\frac{1}{2}$	1.38	8.9	0 1.8	1 39.0	+ 4 17.7	-0.6602	0.5580	0.1847	- 2	-83
URANUS				1 36.7	5 16.8	+ 7 48.2	+0.3054	0.5556	0.1827	+53	-18
38 Virginis	6	1.31	6.9	2 55.8	17 6.8	- 4 45.2	-0.4920	0.5569	0.1814	+ 7	-66
k Virginis	6	1.32	6.5	3 11.5	20 6.8	- 1 51.3	-0.7630	0.5569	0.1803	- 9	-90
48 Virginis	6	+1.31	- 6.3	- 3 2.8	22 5.4	+ 0 3.5	-1.2700	0.5567	-0.1795	-51	-90
$\theta$ Virginis	4 $\frac{1}{2}$	1.31	5.7	4 55.6	4 0 53.8	+ 2 46.4	+0.1858	0.5565	0.1780	+45	-24
l <sup>2</sup> Virginis	6	1.28	4.4	5 39.8	11 9.5	-11 18.2	-0.8451	0.5565	0.1725	-15	-90
81 Virginis	5 $\frac{1}{2}$	1.30	4.0	7 17.3	13 45.5	- 8 47.4	+0.4064	0.5567	0.1706	+58	-12
m Virginis	5 $\frac{1}{2}$	1.30	- 3.7	8 7.5	15 37.9	- 6 58.7	+0.9654	0.5568	0.1693	+92	+22
NEW MOON.											
$\phi$ Ophiuchi	5	+1.44	+ 6.0	-16 21.5	7 22 7.7	- 3 5.0	-0.3747	0.5588	-0.0767	+ 2	-59
24 Scorpii	5	1.48	6.2	17 31.0	8 2 55.8	+ 1 33.5	+0.5270	0.5586	0.0691	+56	- 5
B. A. C. 6060	6	1.68	10.1	18 46.6	9 13 29.4	+10 58.6	+0.4747	0.5542	-0.0132	+47	- 7
B. A. C. 6294	6	+1.78	+11.7	-18 29.7	10 6 14.9	+ 3 11.3	+0.1485	0.5509	+0.0132	+25	-26
$\rho$ Sagittarii	4	+1.93	+13.8	-18 3.6	11 6 19.0	+ 2 29.1	+0.4644	0.5454	+0.0503	+49	- 8

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## NOVEMBER.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1850.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\rho^a$ Sagittarii	5 $\frac{1}{2}$	+1.94	+13.6	-18 31.0	11 6 22.9	+ 2 32.8	+0.9729	0.5450	+0.0510	+72	+24
$\epsilon^a$ Sagittarii	6	2.00	15.0	16 33.0	15 35.8	+11 28.2	-0.6732	0.5426	0.0642	-16	-88
$\epsilon^b$ Sagittarii	5	2.00	15.2	16 23.2	16 28.6	-11 40.7	-0.7986	0.5423	0.0635	-23	-90
$g$ Sagittarii	5 $\frac{1}{2}$	2.05	15.9	15 47.4	12 0 3.3	- 4 20.3	-0.9245	0.5404	0.0757	-30	-90
$\beta$ Capricorni	3	2.14	16.8	15 8.2	11 27.3	+ 6 42.5	-0.6977	0.5378	0.0910	-14	-90
B. A. C. 7063	6	+2.18	+17.0	-15 26.0	16 27.7	+11 33.6	+0.0997	0.5364	+0.0973	+31	-29
$\gamma^1$ Capricorni	5 $\frac{1}{2}$	2.21	17.0	15 32.4	19 35.3	- 9 24.4	+0.5278	0.5357	0.1012	+60	- 5
$\gamma^2$ Capricorni	5	2.22	17.2	15 21.1	20 33.3	- 8 28.3	+0.4172	0.5357	0.1024	+51	-11
Lalande 40522	6	2.30	17.8	14 55.3	13 6 19.7	+ 1 0.3	+0.9936	0.5337	0.1131	+75	+25
8 Aquarii	6	2.30	18.3	13 29.4	6 57.6	+ 1 37.1	-0.5162	0.5335	0.1141	- 1	-69
9 Aquarii	6	+2.31	+18.1	-13 58.3	7 33.9	+ 2 12.3	+0.0848	0.5333	+0.1150	+32	-30
18 Aquarii	6	2.40	18.7	13 21.9	19 14.4	-10 23.5	+0.8318	0.5315	0.1274	+77	+13
$\lambda$ Capricorni	5 $\frac{1}{2}$	2.49	19.3	11 53.4	14 6 38.6	+ 0 35.1	+0.7194	0.5302	0.1386	+78	+ 6
B. A. C. 7620	6	2.52	19.7	10 50.8	10 16.3	+ 4 6.3	+0.0789	0.5297	0.1416	+35	-30
$\theta$ Aquarii	4 $\frac{1}{2}$	2.62	20.5	8 21.0	22 10.7	- 8 20.6	-0.9118	0.5292	0.1515	-21	-90
B. A. C. 7774	6	+2.61	+20.1	- 9 36.5	22 12.0	- 8 19.3	+0.4714	0.5292	+0.1515	+61	- 9
$\rho$ Aquarii	5 $\frac{1}{2}$	2.64	20.5	8 23.5	23 54.6	- 6 39.8	-0.6027	0.5290	0.1530	- 1	-77
Lalande 43974	6	2.70	20.9	7 8.0	15 5 35.7	- 1 8.9	-1.0952	0.5290	0.1573	-34	-90
67 Aquarii	6	2.74	20.6	7 33.6	11 42.8	+ 4 47.2	+0.3473	0.5295	0.1614	+54	-16
B. A. C. 8094	5 $\frac{1}{2}$	2.92	21.3	- 4 6.9	16 4 14.4	- 3 10.9	-0.6514	0.5311	0.1703	- 2	-82
44 Piscium	6	+3.29	+20.2	+ 1 18.5	17 15 12.7	+ 6 43.2	-0.2941	0.5408	+0.1796	+18	-52
B. A. C. 237	6 $\frac{1}{2}$	3.41	19.3	2 46.0	18 3 48.5	- 5 4.6	+0.4220	0.5464	0.1788	+61	-11
73 Piscium	6 $\frac{1}{2}$	3.51	19.0	5 2.6	10 17.9	+ 1 12.2	-0.8143	0.5490	0.1779	-11	-85
77 Piscium	6	3.50	18.6	4 18.1	10 45.1	+ 1 38.6	+0.0455	0.5496	0.1777	+37	-31
$\epsilon$ Piscium	5 $\frac{1}{2}$	3.52	18.7	5 2.8	11 58.5	+ 2 49.6	-0.5196	0.5501	0.1774	+ 6	-68
B. A. C. 410	6	+3.61	+18.2	+ 6 48.9	18 49.4	+ 9 27.1	-1.1623	0.5588	+0.1751	-37	-84
96 Piscium	6 $\frac{1}{2}$	3.64	17.6	6 42.3	21 41.2	-11 46.7	-0.5462	0.5555	0.1740	+ 5	-69
$\mu$ Piscium	5	3.63	17.3	5 33.2	22 12.2	-11 16.7	+0.7457	0.5555	0.1737	+90	+ 8
$\sigma$ Piscium	4 $\frac{1}{2}$	3.75	16.9	8 35.0	19 5 14.0	- 4 29.0	-1.1981	0.5594	0.1702	-42	-82
$\zeta^1$ Ceti	4 $\frac{1}{2}$	3.84	14.5	8 18.6	17 45.6	+ 7 37.1	+1.1652	0.5672	0.1615	+90	+41
$\xi$ Arietis	5 $\frac{1}{2}$	+3.90	+13.7	+10 5.5	23 0.1	-11 19.3	+0.1661	0.5703	+0.1573	+44	-22
B. A. C. 755	6	3.91	13.5	10 2.9	23 51.5	-10 29.7	+0.3441	0.5711	0.1528	+56	-12
31 Arietis	5 $\frac{1}{2}$	3.98	12.9	11 57.2	20 4 9.7	- 6 20.5	-0.9480	0.5735	0.1524	-21	-78
B. A. C. 830	6	3.96	12.2	10 15.2	6 45.4	- 3 50.4	+1.1874	0.5750	0.1496	+90	+45
38 Arietis	5	4.02	12.1	11 57.9	7 48.2	- 2 49.8	-0.4093	0.5761	0.1485	+12	-55
Lalande 5725	6	+4.03	+10.1	+12 45.1	17 1.0	+ 6 3.2	+0.1086	0.5817	+0.1379	+41	-23
B. A. C. 1272	6	4.29	4.0	17 2.0	21 18 30.9	+ 6 35.9	-1.1614	0.5966	0.0999	-41	-73
48 Tauri	6	4.24	3.1	15 6.8	21 41.3	+ 9 39.0	+1.0812	0.5981	0.0945	+90	+41
$\gamma$ Tauri	4	4.25	2.7	15 20.9	23 18.3	+11 12.3	+0.9949	0.5987	0.0915	+90	+35
$\delta^1$ Tauri	4	4.30	2.3	17 16.3	22 0 31.8	-11 37.2	-0.8271	0.5993	0.0913	-13	-73
63 Tauri	6	+4.28	+ 2.2	+16 30.5	0 44.4	-11 25.0	-0.0419	0.5994	+0.0891	+32	-26
$\delta^2$ Tauri	5 $\frac{1}{2}$	4.29	2.2	17 10.6	1 0.1	-11 9.9	-0.6896	0.5994	0.0887	- 5	-71
$\delta^3$ Tauri	5	4.31	2.0	17 39.9	1 33.0	-10 38.3	-1.1314	0.5998	0.0874	-38	-73
70 Tauri	6 $\frac{1}{2}$	4.25	2.0	15 40.6	1 38.3	-10 33.2	+0.8720	0.5998	0.0874	+90	+26
71 Tauri	6	4.24	1.9	15 21.4	1 56.0	-10 16.2	+1.2485	0.5999	0.0870	+90	+57
75 Tauri	6	+4.26	+ 1.7	+16 6.1	2 45.9	- 9 28.2	+0.5438	0.6005	+0.0853	+73	+ 7
$\theta^1$ Tauri	4	4.25	1.7	15 42.4	2 49.1	- 9 25.2	+0.9453	0.6005	0.0853	+90	+32
$\theta^2$ Tauri	4	4.24	1.7	15 36.9	2 51.4	- 9 23.0	+1.0406	0.6005	0.0853	+90	+39
B. A. C. 1391	5	4.25	1.5	15 56.6	3 36.5	- 8 39.6	+0.7729	0.6008	0.0838	+90	+20
85 Tauri	6	4.25	1.3	15 36.2	4 8.1	- 8 9.3	+1.1590	0.6008	0.0831	+90	+50
$\alpha$ Tauri	1	+4.28	+ 0.9	+16 16.7	5 44.7	- 6 36.4	+0.6118	0.6016	+0.0799	+90	+11
B. A. C. 1526	5 $\frac{1}{2}$	4.27	- 1.5	16 58.3	14 14.1	+ 1 33.0	+0.5254	0.6047	0.0637	+71	+ 8
$\eta$ Tauri	5 $\frac{1}{2}$	4.30	2.6	18 29.4	18 8.6	+ 5 18.2	-0.7617	0.6063	0.0558	-10	-72
111 Tauri	5 $\frac{1}{2}$	4.25	4.3	17 16.5	23 0 49.2	+11 42.0	+0.7789	0.6080	0.0418	+90	+25
115 Tauri	6	4.27	4.6	17 51.7	1 53.5	-11 15.4	+0.2362	0.6084	0.0396	+49	- 6
117 Tauri	6 $\frac{1}{2}$	+4.24	- 4.6	+17 8.5	2 14.4	-10 55.3	+0.9685	0.6084	+0.0391	+90	+38
119 Tauri	5	+4.27	- 5.3	+18 30.3	3 50.7	- 9 22.8	-0.3328	0.6087	+0.0354	+16	-38

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>	
		$\Delta\alpha$	$\Delta\delta$									
B. A. C. 1728	6	+4.23	- 5.2	+16 58.1	<sup>d</sup> 3 53.1	<sup>h</sup> 9 20.5	+1.2012	0.6087	+0.0354	+90 <sup>o</sup>	+59 <sup>s</sup>	
120 Tauri	6	4.27	5.4	18 27.4	4 21.5	- 8 53.3	-0.2678	0.6087	0.0348	+19	-34	
127 Tauri	6½	4.27	6.4	18 55.4	7 59.6	- 5 23.9	-0.6217	0.6092	0.0268	- 1	-60	
130 Tauri	6	4.23	6.7	17 41.0	9 46.7	- 3 41.2	+0.6598	0.6095	0.0228	+87	+19	
71 Orionis	6	4.18	9.6	19 11.4	20 22.9	+ 6 29.4	-0.7225	0.6101	+0.0002	- 7	-70	
26 Geminorum	5½	+4.03	-12.1	+17 45.2	<sup>24</sup> 7 5.2	- 7 14.2	+0.5820	0.6094	-0.0231	+77	+15	
λ Geminorum	4	3.85	14.8	16 44.7	21 1.3	+ 6 8.4	+1.0588	0.6063	0.0525	+90	+44	
W. vii. 685	6	3.79	16.0	17 19.6	<sup>25</sup> 2 23.6	+11 18.0	+0.1663	0.6040	0.0639	+45	-12	
f Geminorum	6	3.75	16.6	17 55.8	5 24.9	- 9 47.9	-0.6374	0.6033	0.0697	- 2	-65	
1 Cancri	6	3.63	17.3	16 5.5	12 24.0	- 3 5.2	+0.6663	0.6008	0.0831	+87	+14	
3 Cancri	6	+3.64	-17.9	+17 37.0	13 53.5	- 1 39.3	-0.9833	0.6002	-0.0857	-25	-73	
5 Cancri	6½	3.62	17.7	16 46.0	14 11.5	- 1 21.9	-0.1600	0.6002	0.0860	+25	-32	
29 Cancri	6	3.43	18.6	14 35.1	<sup>26</sup> 1 9.4	+ 9 10.4	+0.9705	0.5952	0.1054	+90	+31	
ξ Leonis	5½	3.40	19.9	11 48.2	<sup>27</sup> 3 30.7	+10 32.6	+0.4629	0.5811	0.1439	+65	- 4	
o Leonis	3½	2.95	19.5	10 24.6	7 27.6	- 9 39.1	+1.2945	0.5791	0.1487	+90	+62	
18 Leonis	6	+2.92	-20.2	+12 20.1	9 40.4	- 7 31.1	-0.9833	0.5780	-0.1510	-23	-78	
B. A. C. 3345	6	2.91	20.1	11 57.3	10 11.0	- 7 1.6	-0.6766	0.5780	0.1514	- 3	-76	
B. A. C. 3398	6	2.84	19.4	9 28.3	14 2.6	- 3 18.4	+1.2448	0.5758	0.1553	+90	+52	
A Leonis	4½	2.77	19.8	10 33.3	19 1.3	+ 1 29.8	-0.6396	0.5732	0.1604	- 1	-75	
44 Leonis	6	2.66	19.5	9 21.8	<sup>28</sup> 2 39.3	+ 8 51.6	-0.6787	0.5694	0.1669	- 3	-79	
48 Leonis	5½	+2.61	-18.8	+ 7 32.5	6 55.0	-11 1.6	+0.4589	0.5675	-0.1701	+64	- 7	
37 Sextantis	6½	2.54	18.5	6 58.4	11 57.9	- 6 9.2	+0.1720	0.5652	0.1736	+45	-23	
38 Sextantis	6	2.53	18.5	6 56.9	12 31.1	- 5 37.2	+0.1009	0.5650	0.1740	+40	-27	
56 Leonis	6½	2.48	18.3	6 47.7	16 26.4	- 1 50.0	-0.4282	0.5633	0.1761	+11	-60	
c Leonis	5½	2.46	18.2	6 42.9	18 34.7	+ 0 14.0	-0.7256	0.5626	0.1772	- 6	-83	
80 Leonis	6½	+2.33	-16.9	+ 4 29.1	<sup>29</sup> 6 2.6	+11 18.5	-0.4972	0.5586	-0.1818	+ 7	-66	
γ Leonis	5	2.32	16.5	3 29.0	7 0.6	-11 45.4	+0.3586	0.5582	0.1821	+57	-14	
89 Leonis	6	2.29	16.5	3 41.7	9 59.1	- 8 52.8	-0.4036	0.5575	0.1828	+12	-60	
β Virginis	3½	2.21	15.3	2 24.5	17 30.1	- 1 36.8	-0.4567	0.5551	0.1842	+10	-64	
JUPITER				+ 0 11.2	<sup>30</sup> 5 24.7	+ 9 54.3	-0.3548	0.5525	0.1824	+15	-56	
13 Virginis	6½	+2.09	-13.4	- 0 9.1	6 38.1	+11 5.3	-0.2287	0.5524	-0.1843	+22	-48	
η Virginis	3½	2.08	13.4	0 1.9	7 13.3	+11 39.3	-0.4608	0.5524	0.1843	+ 9	-64	
URANUS				2 6.0	13 6.1	- 6 39.3	+0.6112	0.5500	0.1827	+77	- 1	
38 Virginis	6	+1.97	-11.0	- 2 55.9	22 56.9	+ 2 52.3	-0.3155	0.5503	-0.1807	+17	-54	

## DECEMBER.

κ Virginis	6	+1.95	-10.6	-3 11.6	1 2 0.2	+5 49.6	-0.5934	0.5503	-0.1798	+2	-76
46 Virginis	6	1.95	10.6	2 45.1	2 27.1	+6 15.6	-1.1366	0.5502	0.1795	-35	-90
48 Virginis	6	1.94	10.4	3 2.9	4 1.1	+7 46.6	-1.1074	0.5501	0.1791	-33	-90
θ Virginis	4½	1.93	9.5	4 55.7	6 52.7	+10 32.7	+0.3550	0.5499	0.1776	+56	-15
ι Virginis	6	+1.84	-8.1	-5 39.8	17 20.6	-3 19.7	-0.7058	0.5496	-0.1724	-6	-90
81 Virginis	5½	1.85	7.2	7 17.3	19 59.9	-0 45.6	+0.5518	0.5498	0.1706	+69	-4
π Virginis	5½	1.85	6.8	8 7.5	21 54.5	+1 5.3	+1.1097	0.5598	0.1693	+82	+33
B. A. C. 4647	6	1.79	6.1	7 29.6	2 4 16.4	+7 14.9	-0.6206	0.5500	0.1650	-2	-79
W. xiii. 825	6	1.82	5.7	8 59.7	4 38.3	+7 36.2	+0.9080	0.5500	0.1644	+81	+17
94 Virginis	6	+1.77	-5.3	-8 20.6	9 37.8	-11 34.0	-0.5934	0.5504	-0.1604	-1	-76
95 Virginis	6	1.78	5.1	8 45.9	9 49.9	-11 22.3	-0.1784	0.5505	0.1604	+22	-45
96 Virginis	6½	1.79	4.8	9 47.5	10 54.2	-10 20.1	+0.7369	0.5505	0.1596	+79	+7
κ Virginis	4½	1.78	4.5	9 44.5	12 44.8	-8 33.1	+0.3925	0.5507	0.1579	+56	-13
2 Libræ	6	1.78	3.6	11 11.4	17 43.5	-3 44.0	+1.1569	0.5509	0.1535	+79	+38
ζ Libræ	6	+1.70	-1.6	-11 25.8	3 8 22.0	+10 25.9	-0.7266	0.5525	-0.1389	-11	-90
ο Libræ	6	1.70	+0.7	14 43.4	21 48.0	-0 34.3	+1.0416	0.5541	0.1227	+76	+29
γ Libræ	4½	1.67	1.4	14 24.3	4 3 39.9	+5 6.1	+0.0036	0.5546	-0.1153	+27	-34
NEW MOON.											
B. A. C. 6294	6	+1.70	+11.3	-18 28.7	7 13 50.0	-11 25.9	-0.0110	0.5529	+0.0118	+16	-35
ρ Sagittarii	4	+1.75	+13.4	-18 3.6	8 13 48.7	+11 46.4	+0.2601	0.5474	+0.0491	+35	-20

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\rho^3$ Sagittarii	5 $\frac{1}{2}$	+1.76	+13.3	-18 31.0	8 13 52.7	+11 50.2	+0.7674	0.5474	+0.0491	+72	+10
B. A. C. 6710	6	1.78	13.9	18 28.9	21 13.9	- 5 2.6	+1.1319	0.5457	0.0597	+72	+39
$\epsilon^1$ Sagittarii	6	1.77	14.3	16 33.1	23 3.2	- 3 16.8	-0.8978	0.5450	0.0624	-30	-90
$\epsilon^2$ Sagittarii	5	1.77	14.3	16 23.3	23 55.8	- 2 25.8	-1.0216	0.5448	0.0639	-39	-90
$g$ Sagittarii	5 $\frac{1}{2}$	1.80	14.9	15 47.5	9 7 28.7	+ 4 52.9	-1.1625	0.5424	0.0749	-50	-90
$\beta$ Capricorni	3	+1.85	+15.7	-15 8.2	18 51.1	- 8 6.0	-0.9546	0.5392	+0.0897	-31	-90
B. A. C. 7063	6	1.87	15.9	15 26.0	23 51.0	- 3 15.3	-0.1610	0.5379	0.0962	+16	-44
$\tau^1$ Capricorni	5 $\frac{1}{2}$	1.90	16.0	15 32.4	10 2 58.4	- 0 13.7	+0.2647	0.5370	0.0909	+41	-20
$\tau^2$ Capricorni	5	1.91	16.1	15 21.1	3 56.4	+ 0 42.5	+0.1536	0.5366	0.1012	+35	-26
Lalande 40522	6	1.98	16.5	14 55.3	13 42.8	+10 11.0	+0.7214	0.5341	0.1126	+75	+ 6
8 Aquarii	6	+1.97	+16.9	-13 29.4	14 20.9	+10 48.0	-0.7973	0.5339	+0.1131	-18	-90
9 Aquarii	6	1.98	16.7	13 58.3	14 57.3	+11 23.3	-0.1924	0.5337	0.1139	-17	-46
18 Aquarii	6	2.05	17.1	13 21.9	11 2 39.9	- 1 15.3	+0.5434	0.5308	0.1266	+64	- 4
$\lambda$ Capricorni	5 $\frac{1}{2}$	2.14	17.7	11 53.4	14 8.1	+ 9 52.3	+0.4227	0.5288	0.1373	+56	-11
B. A. C. 7620	6	2.17	18.1	10 50.8	17 47.4	-10 34.9	-0.2232	0.5278	0.1375	+18	-48
0 Aquarii	4 $\frac{1}{2}$	+2.27	+18.6	- 8 21.0	12 5 49.1	+ 1 5.5	-1.2236	0.5260	+0.1504	-48	-90
B. A. C. 7774	6	2.26	18.2	9 36.5	5 50.3	+ 1 6.7	+0.1637	0.5260	0.1504	+41	-26
$\rho$ Aquarii	5 $\frac{1}{2}$	2.28	18.5	8 23.5	7 34.1	+ 2 47.4	-0.9156	0.5259	0.1518	-21	-90
67 Aquarii	6	2.38	18.5	7 33.6	19 32.1	- 9 35.8	+0.0348	0.5250	0.1600	+35	-33
78 Aquarii	6	2.45	18.4	7 48.6	13 1 25.7	- 3 52.5	+1.2621	0.5252	0.1635	+83	+49
82 Aquarii	6 $\frac{1}{2}$	+2.48	+18.4	- 7 11.1	5 34.4	+ 0 8.9	+1.2583	0.5252	+0.1658	+83	+49
B. A. C. 8094	5 $\frac{1}{2}$	2.58	19.2	4 7.0	12 21.3	+ 6 43.8	-0.9672	0.5255	0.1689	-22	-90
96 Aquarii	5 $\frac{1}{2}$	2.59	18.5	5 44.8	14 18.9	+ 8 37.9	+1.1468	0.5256	0.1696	+85	+36
20 Piscium	5 $\frac{1}{2}$	2.76	18.4	- 3 23.7	14 5 3.7	- 1 3.4	+1.1243	0.5277	0.1750	+87	+34
44 Piscium	6	3.01	18.3	+ 1 18.5	15 0 8.1	- 6 33.4	-0.5816	0.5328	0.1780	+ 3	-74
B. A. C. 237	6 $\frac{1}{2}$	+3.16	+17.3	+ 2 46.0	13 3.5	+ 5 58.3	+0.1599	0.5379	+0.1776	+44	-25
73 Piscium	6 $\frac{1}{2}$	3.28	17.2	5 2.6	19 42.9	-11 34.8	-1.0783	0.5411	0.1765	-30	-85
77 Piscium	6	3.27	16.9	4 18.1	20 11.0	-11 7.5	-0.2085	0.5412	0.1764	+23	-46
$\epsilon$ Piscium	5 $\frac{1}{2}$	3.30	17.1	5 2.8	21 26.1	- 9 54.8	-0.7791	0.5420	0.1761	- 9	-85
96 Piscium	6 $\frac{1}{2}$	3.44	16.2	6 42.3	16 7 23.6	- 0 16.2	-0.7863	0.5475	0.1729	- 9	-84
$\mu$ Piscium	5	+3.43	+15.8	+ 5 33.2	7 55.4	+ 0 14.5	+0.5176	0.5475	+0.1728	+69	- 5
64 Ceti	6	3.71	13.2	8 2.1	17 3 11.2	- 5 7.6	+1.1463	0.5594	0.1623	+90	+39
$\xi^1$ Ceti	4 $\frac{1}{2}$	3.73	13.1	8 18.6	3 55.7	- 4 24.7	+0.9812	0.5599	0.1617	+90	+25
$\xi$ Arietis	5 $\frac{1}{2}$	3.83	12.6	10 5.5	9 16.4	+ 0 45.2	-0.0155	0.5632	0.1577	+34	-32
B. A. C. 755	6	3.84	12.4	10 2.9	10 8.9	+ 1 35.8	+0.1671	0.5640	0.1568	+44	-22
31 Arietis	5 $\frac{1}{2}$	+3.94	+12.1	+11 57.2	14 31.7	+ 5 49.6	-1.1205	0.5675	+0.1528	-35	-78
B. A. C. 830	6	3.91	11.1	10 15.2	17 10.1	+ 8 22.5	+1.0309	0.5692	0.1504	+90	+31
38 Arietis	5	3.97	11.2	11 57.9	18 14.8	+ 9 24.1	-0.5709	0.5698	0.1495	+ 3	-67
Lalande 5725	6	4.09	9.4	12 45.1	18 3 34.6	- 5 35.1	-0.0256	0.5769	0.1390	+33	-30
48 Tauri	6	4.44	2.4	15 6.7	19 8 25.9	- 1 43.2	+1.0224	0.5977	0.0969	+90	+36
$\gamma$ Tauri	4	+4.45	+ 2.0	+15 20.9	10 2.8	- 0 15.0	+0.9378	0.5981	+0.0944	+90	+30
$\delta^1$ Tauri	4	4.50	1.9	17 16.3	11 16.5	+ 0 55.8	-0.8754	0.5991	0.0926	-17	-73
63 Tauri	6	4.49	1.7	16 30.5	11 28.8	+ 1 7.6	-0.0919	0.5996	0.0915	+29	-29
$\delta^2$ Tauri	5 $\frac{1}{2}$	4.50	1.8	17 10.6	11 44.4	+ 1 22.7	-0.7382	0.5996	0.0915	- 8	-73
$\delta^3$ Tauri	5	4.52	1.6	17 39.9	12 17.5	+ 1 54.5	-1.1771	0.5998	0.0907	-43	-73
70 Tauri	6 $\frac{1}{2}$	+4.47	+ 1.4	+15 40.6	12 22.7	+ 1 59.5	+0.8231	0.5998	+0.0905	+90	+23
71 Tauri	6	4.46	1.2	15 21.4	12 40.3	+ 2 16.3	+1.1703	0.6002	0.0896	+90	+51
75 Tauri	6	4.49	1.1	16 6.1	13 30.0	+ 3 4.2	+0.4972	0.6009	0.0879	+68	+ 4
$\theta^1$ Tauri	4	4.48	1.1	15 42.4	13 33.2	+ 3 7.2	+0.8976	0.6009	0.0879	+90	+28
$\theta^2$ Tauri	4	4.47	1.0	15 36.9	13 35.6	+ 3 9.5	+0.9920	0.6009	0.0879	+90	+35
B. A. C. 1391	5	+4.49	+ 0.9	+15 56.6	14 20.6	+ 3 52.7	+0.7288	0.6009	+0.0871	+90	+17
81 Tauri	6 $\frac{1}{2}$	4.48	0.8	15 26.5	14 23.4	+ 3 55.4	+1.2342	0.6011	0.0869	+90	+59
85 Tauri	6	4.48	0.6	15 36.2	14 52.0	+ 4 22.9	+1.1138	0.6015	0.0857	+90	+45
$\alpha$ Tauri	1	4.52	+ 0.2	16 16.1	16 28.1	+ 5 55.2	+0.5830	0.6026	0.0825	+76	+ 9
B. A. C. 1526	5 $\frac{1}{2}$	4.57	- 2.1	16 58.3	20 0 54.1	- 9 58.8	+0.5110	0.6071	0.0665	+70	+ 7
$\pi$ Tauri	5 $\frac{1}{2}$	+4.63	- 3.1	+18 29.3	4 46.3	- 6 15.9	-0.7553	0.6092	+0.0586	- 9	-72
111 Tauri	5 $\frac{1}{2}$	+4.62	- 5.2	+17 16.5	11 21.9	+ 0 3.7	+0.7896	0.6120	+0.0453	+90	+25

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1885.0.		Apparent Declination.	Washington Mean Time.	HourAngle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
115 Tauri	6	+4.64	- 5.4	+17 51.7	20 12 25.1	+ 1 4.4	+0.2543	0.6124	+0.0421	+50	- 5
117 Tauri	6½	4.61	5.6	17 8.5	12 45.8	+ 1 24.2	+0.9804	0.6125	0.0418	+90	+38
119 Tauri	5	4.66	6.0	18 30.3	14 20.7	+ 2 55.2	-0.3052	0.6130	0.0390	+17	-37
120 Tauri	6	4.66	6.2	18 27.4	14 51.0	+ 3 24.3	-0.2376	0.6137	0.0375	+21	-33
127 Tauri	6½	4.68	7.3	18 55.4	18 25.5	+ 6 50.1	-0.5801	0.6148	0.0292	+ 2	-56
130 Tauri	6	+4.65	- 7.8	+17 41.0	20 10.6	+ 8 30.9	+0.6950	0.6152	+0.0260	+90	+21
71 Orionis	6	4.67	10.8	19 11.4	21 6 33.4	- 5 32.0	-0.6452	0.6174	+0.0023	- 2	-61
26 Geminorum	5½	4.58	13.6	17 45.2	16 59.4	+ 4 28.1	+0.6720	0.6181	-0.0208	+89	+20
λ Geminorum	4	4.49	16.8	16 44.6	22 6 30.4	- 6 34.5	+1.1757	0.6167	0.0514	+90	+55
W. vii. 685	6	4.46	18.1	17 19.6	11 42.2	- 1 35.5	+0.3078	0.6156	0.0624	+54	- 4
f Geminorum	6	+4.45	-19.8	+17 55.8	14 37.2	+ 1 12.3	-0.4765	0.6146	-0.0686	+ 8	-51
1 Cancri	6	4.35	20.0	16 5.5	21 21.7	+ 7 40.4	+0.8228	0.6128	0.0819	+90	+24
3 Cancri	6	4.37	20.6	17 37.0	22 47.8	+ 9 2.9	-0.7984	0.6121	0.0853	-12	-73
5 Cancri	6½	4.35	20.5	16 46.0	23 5.2	+ 9 19.6	+0.0131	0.6121	0.0856	+36	-22
29 Cancri	6	4.19	22.0	14 35.0	23 9 38.7	- 4 32.4	+1.1511	0.6071	0.1059	+90	+47
54 Cancri	6½	+4.10	-23.5	+15 46.2	18 27.5	+ 3 55.5	-1.0186	0.6025	-0.1212	-26	-75
ξ Leonis	5½	3.83	24.3	11 48.2	24 11 0.1	- 4 10.4	+0.7001	0.5907	0.1452	+90	+10
18 Leonis	6	3.76	24.9	12 20.0	16 56.5	+ 1 32.5	-0.7134	0.5893	0.1527	- 5	-78
B. A. C. 3345	6	3.75	24.8	11 57.2	17 25.7	+ 2 0.7	-0.4116	0.5892	0.1536	+12	-55
A Leonis	5½	3.63	24.9	10 33.2	25 1 57.4	+10 13.3	-0.3630	0.5835	0.1622	+15	-53
44 Leonis	6	+3.54	-24.7	+ 9 21.7	9 20.1	- 6 40.1	-0.3944	0.5795	-0.1688	+13	-56
48 Leonis	5½	3.48	24.1	7 32.4	13 27.6	- 2 41.6	+0.7318	0.5754	0.1724	+90	+ 8
49 Leonis	6	3.48	24.6	9 14.2	13 32.9	- 2 36.5	-0.9897	0.5754	0.1724	-23	-81
37 Sextantis	6½	3.41	23.8	6 58.3	18 21.3	+ 2 1.6	-0.4533	0.5745	0.1755	+64	- 8
38 Sextantis	6	3.40	23.8	6 56.8	18 53.5	+ 2 32.6	+0.3846	0.5740	0.1758	+59	-12
56 Leonis	6½	+3.36	-23.7	+ 6 47.6	22 41.9	+ 6 13.0	-0.1363	0.5718	-0.1782	+27	-41
c Leonis	5½	3.34	23.7	6 42.8	26 0 46.6	+ 8 13.4	-0.4263	0.5709	0.1793	+11	-60
80 Leonis	6½	3.21	22.6	4 29.0	11 57.0	- 4 59.6	-0.1966	0.5652	0.1838	+24	-46
τ Leonis	5	3.20	22.2	3 28.9	12 53.6	- 4 4.9	+0.6495	0.5645	0.1840	+82	+ 2
89 Leonis	6	3.17	22.2	3 41.6	15 48.1	- 1 16.4	-0.1019	0.5631	0.1848	+29	-40
β Virginis	3½	+3.09	-21.2	+ 2 24.4	23 10.1	+ 5 50.5	-0.1552	0.5603	-0.1860	+26	-44
13 Virginis	6½	2.96	19.1	- 0 9.2	27 12 5.4	- 5 40.1	+0.0705	0.5555	0.1860	+39	-31
η Virginis	3½	2.95	19.1	0 2.0	12 40.0	- 5 6.7	-0.1615	0.5551	0.1858	+26	-44
JUPITER				0 52.1	15 55.3	- 1 57.8	+0.0964	0.5543	0.1851	+39	-29
URANUS				2 21.7	19 41.1	+ 1 40.6	+0.9455	0.5530	0.1843	+88	+20
38 Virginis	6	+2.80	-16.5	- 2 56.0	28 4 14.6	+ 9 57.3	-0.0278	0.5513	-0.1821	+33	-36
k Virginis	6	2.77	16.0	3 11.7	7 16.8	-11 6.5	-0.3058	0.5507	0.1808	+17	-53
46 Virginis	6	2.76	16.0	2 45.2	7 43.5	-10 40.6	-0.8482	0.5507	0.1806	-14	-90
48 Virginis	6	2.75	15.8	3 3.0	9 17.2	- 9 9.9	-0.8210	0.5501	0.1802	-12	-90
θ Virginis	4½	2.75	14.9	4 55.7	12 8.1	- 6 24.6	+0.6307	0.5498	0.1787	+78	0
65 Virginis	6	+2.68	-14.1	- 4 19.5	18 28.6	- 0 16.4	-1.1238	0.5487	-0.1753	-35	-90
66 Virginis	6	2.67	14.0	4 34.0	19 3.2	+ 0 17.1	-0.9718	0.5487	0.1752	-23	-90
l² Virginis	6	2.66	13.3	5 39.9	22 35.2	+ 3 42.3	-0.4361	0.5484	0.1729	+10	-62
81 Virginis	5½	2.66	12.3	7 17.4	29 1 14.7	+ 6 16.5	+0.8174	0.5482	0.1714	+83	+11
π Virginis	6	2.59	11.9	6 16.0	6 21.7	+11 13.7	-1.1308	0.5478	0.1680	-36	-90
B. A. C. 4647	6	+2.58	-11.1	- 7 29.7	9 32.6	- 9 41.6	-0.3646	0.5476	-0.1654	+13	-57
W. xiii. 825	6	2.61	10.6	8 59.8	9 54.8	- 9 20.1	+1.1609	0.5476	0.1653	+81	+38
94 Virginis	6	2.55	10.1	8 20.7	14 55.8	- 4 28.8	-0.3462	0.5474	0.1613	+13	-56
95 Virginis	6	2.56	9.9	8 46.0	15 8.1	- 4 16.9	+0.0671	0.5474	0.1613	+36	-31
96 Virginis	6½	2.57	9.4	9 47.6	16 12.8	- 3 14.2	+0.9824	0.5474	0.1603	+81	+23
κ Virginis	4½	+2.55	- 9.2	- 9 44.6	18 4.1	- 1 26.5	+0.6349	0.5471	-0.1586	+75	+ 1
ξ¹ Libræ	6	2.41	5.7	11 25.9	30 12 51.8	- 7 17.0	-0.5210	0.5478	0.1393	+1	-63
ξ² Libræ	6	2.41	5.6	10 56.9	15 0.4	- 5 10.5	-1.1984	0.5490	0.1383	-47	-90
σ² Libræ	6	2.38	2.6	14 43.4	31 3 27.5	+ 6 52.5	+1.2260	0.5490	0.1237	+76	+48
γ Libræ	4½	2.32	1.7	14 24.3	9 24.0	-11 22.4	+0.1691	0.5495	0.1160	+37	-25
η Libræ	6	+2.31	- 0.7	-15 18.4	13 27.0	- 7 27.2	+0.6829	0.5501	-0.1110	+73	+ 4
49 Libræ	6	+2.28	+ 1.0	-16 11.6	21 10.4	+ 0 1.1	+0.8275	0.5508	-0.1015	+74	+13

		DOWNES'S TABLE GIVING VALUES OF $\tau$ .																							
		FOR COMPUTING THE TIME AND HOUR-ANGLE OF APPARENT CONJUNCTION.																							
h		Lat. 72°			Lat. 66°			Lat. 60°			Lat. 54°			Lat. 48°			Lat. 42°			Lat. 36°					
		$x'$			$x'$			$x'$			$x'$			$x'$			$x'$			$x'$					
		.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50
0	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	2	2	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	7	7	7
20	3	3	4	4	5	5	5	5	6	7	6	7	9	8	9	11	9	10	12	11	12	14	12	14	14
30	5	5	6	6	7	8	8	8	9	11	10	11	13	12	13	16	14	16	18	16	18	22	18	22	22
40	6	7	8	8	9	11	11	11	12	14	13	15	17	16	18	21	18	21	24	21	24	29	24	29	29
50	7	8	10	10	11	13	13	13	15	17	16	19	21	19	22	26	22	26	30	26	30	36	30	36	36
1	0	9	10	11	12	14	16	16	18	21	19	22	26	23	26	31	26	31	36	30	35	42	35	42	42
10	10	12	13	14	16	18	18	18	21	24	22	26	30	26	30	36	31	35	42	35	40	48	40	48	48
20	12	13	15	16	18	21	21	21	23	27	25	29	34	30	34	40	35	40	47	39	45	54	45	54	54
30	13	15	17	18	20	23	23	23	26	30	28	32	37	33	38	45	39	44	52	43	50	59	50	59	59
40	14	16	18	20	22	25	25	25	29	33	31	35	41	36	42	49	42	48	57	47	54	64	54	64	64
50	16	18	20	21	24	28	27	31	36	34	38	44	39	45	53	45	52	61	51	58	68	58	68	68	68
2	0	17	19	22	23	26	30	29	33	39	36	41	47	42	48	56	48	55	65	54	62	72	62	72	72
10	18	20	23	25	28	32	31	36	41	38	43	50	45	51	59	68	57	66	76	65	76	86	76	86	86
20	19	22	24	26	30	34	33	38	43	40	46	53	47	54	62	54	62	71	60	69	80	69	80	80	80
30	20	23	26	28	31	36	35	40	45	42	48	55	50	56	65	57	64	74	63	72	83	72	83	83	83
40	21	24	27	29	33	37	37	42	47	44	50	58	52	59	68	59	67	77	65	74	86	74	86	86	86
50	22	25	28	30	34	39	38	43	49	46	52	60	54	61	70	61	69	79	68	76	88	76	88	88	88
3	0	23	26	30	31	35	40	40	45	51	48	54	62	56	63	72	63	71	81	70	79	90	79	90	90
10	24	27	31	33	36	42	41	46	53	49	56	63	57	65	74	65	73	83	72	81	92	81	92	92	92
20	25	28	32	34	38	43	42	47	54	51	57	65	59	66	75	66	74	85	73	82	93	82	93	93	93
30	26	29	33	35	39	44	43	49	55	52	58	66	60	67	77	68	76	86	74	83	95	83	95	95	95
40	26	29	33	36	40	45	44	50	56	53	59	67	61	69	78	69	77	87	75	84	96	84	96	96	96
50	27	30	34	36	41	46	45	51	57	54	60	68	62	70	79	70	78	88	76	85	96	85	96	96	96
4	0	28	31	35	37	41	47	46	52	58	55	61	69	63	70	79	71	79	89	77	86	97	86	97	97
10	28	31	35	38	42	47	47	52	59	56	62	70	64	71	80	71	79	89	78	86	97	86	97	97	97
20	29	32	36	38	42	48	47	53	59	56	62	70	64	71	80	72	80	89	78	87	97	87	97	97	97
30	29	32	36	39	43	48	48	53	60	57	63	71	65	72	81	72	80	90	79	87	97	87	97	97	97
40	29	33	37	39	43	49	48	53	60	57	63	71	65	72	81	72	80	89	79	87	97	87	97	97	97
50	30	33	37	39	44	49	48	54	60	57	63	71	65	72	81	72	80	89	79	87	96	87	96	96	96
5	0	30	33	37	39	44	49	49	54	60	57	63	71	65	72	80	72	80	89	78	86	95	86	95	95
10	30	33	37	40	44	49	49	54	60	57	63	71	65	72	80	72	79	88	78	86	95	86	95	95	95
20	30	33	37	40	44	49	49	54	60	57	63	71	65	71	79	72	79	88	78	85	94	85	94	94	94
30	30	33	37	40	44	49	49	54	60	57	63	70	64	71	79	71	78	87	77	85	93	85	93	93	93
40	30	33	37	39	44	49	48	53	59	56	62	70	64	70	78	70	77	86	76	84	91	84	91	91	91
50	30	33	37	39	43	48	48	53	59	56	61	69	63	70	77	70	77	85	75	83	90	83	90	90	90
6	0	30	33	37	39	43	48	48	52	58	55	61	68	63	69	76	69	76	84	74	82	89	82	89	89
10	30	33	37	39	43	47	47	52	58	55	60	67	62	68	75	68	75	82	73	80	87	80	87	87	87
20	29	32	36	38	42	47	47	51	57	54	60	66	61	67	74	67	73	81	72	79	85	79	85	85	85
30	29	32	36	38	42	46	46	51	56	53	59	65	60	66	73	66	72	80	71	78	84	78	84	84	84
40	29	32	35	37	41	46	45	50	55	53	58	64	59	65	71	65	71	78	70	76	82	76	82	82	82
50	28	31	35	37	40	45	45	49	54	52	57	62	58	63	70	63	69	76	68	74	80	74	80	80	80
7	0	28	31	34	36	40	44	44	48	53	51	55	61	57	62	68	62	68	75	67	73	78	73	78	78
10	27	30	34	35	39	43	43	47	52	50	54	60	56	61	67	61	66	73	65	71	76	71	76	76	76
20	27	30	33	35	38	42	42	46	51	48	53	58	54	59	65	59	65	71	64	69	74	69	74	74	74
30	26	29	32	34	37	41	41	45	49	47	52	57	53	58	63	58	63	69	62	67	71	67	71	71	71
40	26	28	31	33	36	40	40	44	48	46	50	55	51	56	62	56	61	67	61	67	71	67	71	71	71
50	25	27	31	32	35	39	39	42	47	45	49	53	50	54	60	54	59	65	59	65	71	65	71	71	71
8	0	24	27	30	31	34	38	38	41	45	43	47	52	48	52	58	53	57	63	57	63	69	63	69	69
10	24	26	29	30	33	37	36	40	44	42	46	50	47	51	56	52	55	60	55	60	66	60	66	66	66
20	23	25	28	29	32	35	35	38	42	40	44	48	45	49	54	49	54	59	54	59	64	59	64	64	64
30	22	24	27	28	31	34	34	37	41	39	42	46	43	47	52	47	52	57	52	57	62	57	62	62	62
40	21	23	26	27	30	33	33	35	39	37	41	44	41	45	49	44	49	54	49	54	59	54	59	59	59
50	20	22	25	26	28	31	31	34	37	36	39	42	40	43	47	40	43	47	42	47	52	47	52	52	52
9	0	19	21	24	25	27	30	30	32	35	34	37	40												
10	18	20	22	24	26	28	28	31	34	32	35	38													
20	18	19	21	22	24	27	27	29	32	31	33	36													
30	16	18	20	21	23	25	25	27	30	29	31	34													
40	15	17	19	20	22	24	24	26	28	27	29	32													

(Concluded at bottom of next page.)

DOWNES'S TABLE GIVING VALUES OF $\tau$ . FOR COMPUTING THE TIME AND HOUR-ANGLE OF APPARENT CONJUNCTION.																			
A		Lat. 30°			Lat. 24°			Lat. 18°			Lat. 12°			Lat. 6°			Lat. 0°		
		$z'$			$z'$			$z'$			$z'$			$z'$			$z'$		
		.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50
h m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	6	7	8	7	7	9	7	8	9	7	8	10	7	8	10	8	9	11	
20	12	14	16	13	14	18	14	16	19	14	16	20	14	17	21	15	18	21	
30	17	20	24	19	22	27	20	24	29	21	25	30	21	25	31	22	26	32	
40	23	27	32	25	29	36	26	32	39	28	33	40	28	34	41	29	34	42	
50	28	33	40	31	36	44	32	39	48	35	40	50	35	42	51	35	42	52	
1 0	33	39	47	36	42	52	38	46	56	40	47	59	41	49	60	41	49	61	
10	38	45	54	41	48	59	44	52	63	46	54	67	47	56	68	47	56	69	
20	43	50	60	46	54	65	49	58	70	52	60	74	53	62	75	53	63	76	
30	48	55	66	51	60	71	54	64	76	57	66	79	58	68	81	59	69	82	
40	52	60	71	56	65	77	59	69	82	62	72	84	63	73	87	64	74	88	
50	56	64	76	60	69	82	64	74	87	66	77	89	68	78	92	68	79	93	
2 0	59	68	80	64	73	86	68	78	91	70	81	95	72	83	97	72	83	98	
10	62	72	84	67	77	90	71	81	95	74	85	99	75	87	101	76	87	102	
20	65	75	87	70	81	94	74	85	99	77	88	103	78	90	105	79	91	106	
30	68	78	90	73	84	97	77	88	102	80	91	106	81	93	108	82	94	109	
40	71	81	93	76	87	100	80	91	105	83	94	109	84	96	111	85	97	112	
50	74	83	96	78	89	102	82	93	107	85	96	111	87	98	113	87	99	114	
3 0	76	85	98	80	91	104	84	95	109	87	98	113	89	100	115	89	101	116	
10	77	87	99	82	92	106	86	97	111	89	100	114	91	102	116	91	103	117	
20	79	89	101	84	94	107	88	99	112	91	102	115	92	104	118	93	104	118	
30	80	90	102	85	95	108	89	100	113	92	103	116	94	105	119	94	105	119	
40	81	91	103	86	96	109	90	101	114	93	104	117	95	106	119	95	106	120	
50	82	92	104	87	97	110	91	101	114	94	104	118	95	106	120	96	107	120	
4 0	83	92	104	88	98	110	92	102	114	94	105	118	96	107	120	97	107	120	
10	84	93	104	88	98	110	92	102	114	95	105	118	96	107	120	97	107	120	
20	84	93	104	89	98	110	92	102	114	95	105	117	96	107	119	97	107	120	
30	84	93	104	89	98	110	92	102	114	95	105	117	96	107	119	97	107	119	
40	84	93	104	89	98	109	92	102	113	95	104	116	96	106	118	97	107	119	
50	84	93	103	88	97	108	92	101	113	94	104	115	96	106	117	96	106	118	
5 0	84	92	102	88	97	108	91	101	112	94	103	114	95	105	116	96	105	117	
10	83	92	102	88	96	107	91	100	110	93	102	113	95	104	115	95	104	115	
20	83	91	101	87	95	106	90	99	109	92	101	112	94	103	114	94	103	114	
30	82	90	100	86	94	104	89	98	108	92	100	111	93	102	112	93	102	113	
40	81	89	98	85	93	103	88	97	106	91	99	109	92	100	110				
50	80	88	97	84	92	101	87	95	105	89	97	107							
6 0	79	87	95	83	91	100	86	94	103	88	96	105							
10	78	85	94	82	89	98	84	92	101										
20	77	84	92	80	88	96	82	91	99										
30	75	82	90	79	86	94													
40	74	81	88	77	84	92													
50	72	79	86																
7 0	71	77	84																

(Concluded from preceding page.)

k		Lat. 72°			Lat. 66°			Lat. 60°			h m		Lat. 72°			Lat. 66°			Lat. 60°		
		$z'$			$z'$			$z'$					$z'$			$z'$					
		.62	.56	.50	.62	.56	.50	.62	.56	.50			.62	.56	.50	.62	.56	.50	.62	.56	.50
h m	m	m	m	m	m	m	m	m	m	m	h m	m	m	m	m	m	m	m	m		
9 50	14	16	18	13	20	22	22	24	26		11 0	7	8	8	9	10	11	10	11	12	
10 0	13	15	16	17	19	21	20	22	24		10	6	6	7	7	8	9	9	9	10	
10	12	14	15	16	17	19	19	21	22		20	5	5	6	6	6	7	7	8	8	
20	11	12	14	15	16	17	17	19	20		30	3	4	4	4	5	5				
30	10	11	12	13	14	16	16	17	18		40	2	3	3	3	3	4				
40	9	10	11	12	13	14	14	15	16		50	1	1	1	1	2	2				
50	8	9	10	10	11	12	12	13	14		12 0	0	0	0	0	0	0				

## OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1885.

Date.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Occul- tation.
			Washington		Angle from		Washington		Angle from		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver tex.	
Jan. 1	1 Cancri	6	<sup>h</sup> 7 <sup>m</sup> 13	<sup>h</sup> 12 <sup>m</sup> 25	13°	30°	<sup>h</sup> Star 0 <sup>h</sup> 9	<sup>h</sup> north of	<sup>h</sup> D's	<sup>h</sup> limb.	<sup>h</sup> <sup>m</sup>
3	B. A. C. 3407	6	8 21	13 25	129	159	9 38	14 42	277	283	1 17
3	π Leonis	5	9 50	14 53	140	142	11 2	16 5	269	245	1 12
4	35 Sextantis *	6½	3 56	8 57	176	226	4 13	9 14	214	264	0 17
10	θ Libræ	4½	11 37	16 12	62	107	12 28	17 4	334	12	0 52
NEW MOON.											
22	96 Piscium †	6½	7 33	11 23	132	81	8 3	11 52	200	150	0 30
25	63 Tauri †	6	10 11	14 8	63	11	10 56	14 53	293	244	0 46
26	115 Tauri	6	11 42	15 15	41	350	12 13	15 46	325	276	0 31
28	λ Geminorum	4	4 39	8 5	184	233	Star 0 <sup>h</sup> 5	south of	D's	limb.	
28	68 Geminorum	5½	12 30	15 55	161	107	13 0	16 25	225	172	0 30
31	43 Leonis	6½	7 34	10 47	155	198	8 29	11 43	248	281	0 55
Feb. 1	79 Leonis	5½	12 3	15 13	168	153	12 53	16 2	246	218	0 50
5	μ Libræ	6	14 46	17 39	202	202	Star 4 <sup>h</sup> 7	south of	D's	limb.	
NEW MOON.											
18	ε Piscium	5½	4 34	6 37	99	53	5 33	7 37	223	173	1 0
20	Lalande 5725 *	6	10 3	11 58	131	83	10 44	12 39	209	163	0 41
22	B. A. C. 1526	5½	8 26	10 13	146	92	9 3	10 51	215	161	0 37
27	B. A. C. 3407	6	9 39	11 7	149	154	10 45	12 12	259	239	1 5
27	π Leonis	5	11 7	12 35	157	132	12 2	13 30	251	213	0 55
28	δ Leonis	4½	13 57	15 19	83	40	14 54	16 17	323	275	0 58
Mar. 4	2 Libræ	6	11 3	12 10	54	93	11 43	12 50	352	26	0 40
5	ο <sup>1</sup> Libræ	6	16 34	17 37	151	129	17 33	18 36	236	206	0 59
5	ο <sup>2</sup> Libræ	6	18 10	19 13	11	316	Star 3 <sup>h</sup> 8	north of	D's	limb.	
6	49 Libræ *	6	9 26	10 26	76	128	10 18	11 17	314	5	0 51
NEW MOON.											
19	38 Arietis	5	8 30	8 39	33	341	9 7	9 16	308	258	0 37
22	130 Tauri †	6	11 57	11 53	64	12	12 41	12 38	305	256	0 45
23	26 Geminorum	5½	10 14	10 7	10	316	Star 3 <sup>h</sup> 5	north of	D's	limb.	
25	Α Cancri	6	12 32	12 17	199	147	Star 0 <sup>h</sup> 1	south of	D's	limb.	
27	35 Sextantis *	6½	16 55	16 31	107	56	17 46	17 23	288	239	0 51
NEW MOON.											
Apr. 17	63 Tauri	6	10 40	8 55	358	307	Star 3 <sup>h</sup> 3	north of	D's	limb.	
18	111 Tauri	5½	10 38	8 49	144	90	11 13	9 24	222	169	0 35
18	117 Tauri *	6½	12 20	10 31	183	134	Star 1 <sup>h</sup> 9	south of	D's	limb.	
20	68 Geminorum †	5½	14 12	12 15	113	63	15 0	13 3	269	223	0 48
23	43 Leonis	6½	15 32	13 22	72	20	16 17	14 7	326	275	0 45
24	75 Leonis †	5½	16 49	14 35	124	73	17 42	15 29	273	222	0 53
24	76 Leonis *	6½	18 8	15 54	198	148	Star 1 <sup>h</sup> 6	south of	D's	limb.	
27	B. A. C. 4591	6	16 4	13 39	91	59	17 17	14 51	306	264	1 12
29	ο <sup>2</sup> Libræ	6	12 18	9 45	65	101	13 16	10 43	336	2	0 57
May 2	B. A. C. 6060	6	12 53	10 8	63	111	13 52	11 6	313	356	0 58
5	B. A. C. 7063	6	16 59	14 2	58	97	18 18	15 20	282	310	1 19
NEW MOON.											
20	B. A. C. 3407	6	11 13	7 18	204	176	Star 1 <sup>h</sup> 9	south of	D's	limb.	
21	δ Leonis	4½	15 58	11 58	110	59	16 55	12 55	289	238	0 58

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.



## OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1885.

Date.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Occul- tation.
			Washington		Angle from		Washington		Angle from		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
			h m	h m	°	°	h m	h m	°	°	h m
May 27	$\theta$ Libræ	4½	11 28	7 5	144	189	12 27	8 3	252	290	0 58
31	$\rho^1$ Sagittarii	4	15 15	10 36	60	103	16 25	11 46	298	332	1 10
June 2	9 Aquarii	6	17 5	12 17	13	56	17 36	12 49	325	4	0 32
3	B. A. C. 7620	6	20 1	15 9	50	75	21 27	16 35	266	271	1 27
7	77 Piscium†	6	18 41	13 33	53	104	19 35	14 28	268	319	0 54
NEW MOON.											
16	$\alpha$ Leonis	3½	12 27	6 45	114	68	13 33	7 51	289	238	1 6
23	$\theta$ Libræ *	4½	21 42	15 32	126	74	22 31	16 21	242	190	0 49
July 4	B. A. C. 237	6½	21 23	14 29	93	138	22 30	15 36	216	252	1 8
8	B. A. C. 1391 †	5	21 29	14 19	118	167	22 8	14 58	218	269	0 39
8	$\alpha$ Tauri	1	23 35	16 25	107	161	0 28	17 18	226	280	0 53
NEW MOON.											
26	$\tau^1$ Capricorni	5½	22 8	13 47	78	56	23 29	15 8	242	206	1 21
26	$\tau^2$ Capricorni	5	23 31	15 11	74	39	0 44	16 23	247	202	1 13
27	18 Aquarii	6	21 22	12 57	158	157	Star 0'5	south of	D's	limb.	
28	B. A. C. 7774	6	0 50	16 21	111	77	1 42	17 13	200	158	0 52
Aug. 7	26 Geminorum *	5½	14 29	5 22	6	322	Star 4'7	north of	D's	limb.	
7	$\lambda$ Geminorum	4	1 53	16 44	180	126	Star 3'3	south of	D's	limb.	
NEW MOON.											
15	2 Libræ	6	18 31	8 52	138	92	19 25	9 47	248	198	0 54
17	49 Libræ	6	15 8	5 22	90	101	16 38	6 52	300	289	1 29
24	$\lambda$ Capricorni *	5½	15 2	4 48	115	167	15 50	5 37	225	276	0 48
25	67 Aquarii	6	20 51	10 33	17	43	21 49	11 31	295	308	0 58
Sept. 1	B. A. C. 1526	5½	4 25	17 38	77	89	5 49	19 2	267	240	1 24
2	130 Tauri	6	23 46	12 56	45	98	0 32	13 42	299	353	0 46
4	1 Cancri	6	3 22	16 23	79	133	4 26	17 27	290	342	1 4
NEW MOON.											
13	$\eta$ Libræ	6	18 48	7 15	49	11	19 37	8 4	327	283	0 49
24	B. A. C. 237	6½	21 1	8 45	6	52	21 36	9 20	307	351	0 35
24	77 Piscium	6	6 27	18 10	22	331	7 4	18 46	305	254	0 37
28	70 Tauri†	6½	21 14	8 42	74	122	22 6	9 34	261	312	0 52
28	75 Tauri	6	22 58	10 25	346	39	Star 0'5	north of	D's	limb.	
28	$\theta^1$ Tauri	4	22 25	9 53	102	154	23 17	10 45	230	284	0 52
28	$\theta^2$ Tauri	4	22 34	10 1	129	182	23 9	10 36	204	258	0 35
28	B. A. C. 1391	5	23 18	10 45	76	130	0 20	11 47	254	305	1 2
28	$\alpha$ Tauri	1	2 3	13 30	76	123	3 23	14 50	256	285	1 20
29	111 Tauri†	5½	21 49	9 13	50	96	22 32	9 56	293	343	0 43
29	117 Tauri	6½	23 8	10 31	104	155	0 0	11 23	237	290	0 52
Oct. 2	29 Cancri†	6	0 59	12 10	117	164	1 45	12 56	253	303	0 46
3	$\xi$ Leonis	5½	3 46	14 54	10	62	Star 1'6	north of	D's	limb.	
4	48 Leonis	5½	6 55	17 58	38	86	7 18	18 21	0	46	0 23
NEW MOON.											
10	$\alpha^2$ Libræ.*	6	20 33	7 14	170	120	20 51	7 32	205	154	0 18
13	B. A. C. 6060	6	18 37	5 6	42	31	19 39	6 9	315	292	1 3
16	B. A. C. 7063	6	23 22	9 39	341	305	Star 3'4	north of	D's	limb.	
22	$\mu$ Piscium	5	2 59	12 51	157	127	Star 5'2	south of	D's	limb.	
23	$\xi$ Arietis	5½	3 54	13 42	29	356	4 52	14 41	293	249	0 59

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

## OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1885.

Date.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Occul- tation.
			Washington		Angle from		Washington		Angle from		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
Oct. 23	B. A. C. 755	6	<sup>h</sup> 4 <sup>m</sup> 49	<sup>h</sup> 14 <sup>m</sup> 37	76°	33°	<sup>h</sup> 6 <sup>m</sup> 2	<sup>h</sup> 15 <sup>m</sup> 50	252°	202°	<sup>h</sup> 1 <sup>m</sup> 13
25	75 Tauri	6	9 8	18 48	92	38	10 6	19 46	263	210	0 59
26	111 Tauri	5½	7 54	17 30	180	131	Star 0'.8	south of	D's	limb.	
NEW MOON.											
Nov. 11	ρ <sup>1</sup> Sagittarii	4	22 36	7 11	28	349	23 25	8 0	305	261	0 49
11	ρ <sup>2</sup> Sagittarii	5½	22 49	7 24	166	126	Star 1'.2	south of	D's	limb.	
13	Lalande 40522	6	21 53	6 24	136	121	22 24	6 55	179	157	0 31
14	λ Capricorni	5½	21 52	6 15	66	63	23 21	7 44	245	221	1 30
15	67 Aquarii *	6	4 26	12 44	65	14	5 22	13 40	257	205	0 56
22	B. A. C. 1526	5½	6 36	14 26	120	80	7 36	15 26	233	183	1 1
23	130 Tauri	6	0 17	8 4	103	157	1 12	8 59	240	295	0 55
25	1 Cancri	6	3 27	11 5	165	219	3 48	11 27	203	257	0 22
28	38 Sextantis *	6	3 37	11 4	14	63	Star 1'.8	north of	D's	limb.	
NEW MOON.											
Dec. 14	20 Piscium	5½	21 36	4 1	154	185	Star 2'.0	south of	D's	limb.	
16	μ Piscium	5	1 5	7 22	83	89	2 30	8 47	245	223	1 25
17	B. A. C. 755	6	4 29	10 41	24	346	5 21	11 33	299	252	0 52
19	75 Tauri	6	8 5	14 9	106	53	9 5	15 8	246	192	1 0
19	B. A. C. 1391	5	9 31	15 35	177	123	Star 0'.8	south of	D's	limb.	
19	α Tauri †	1	11 14	17 18	92	42	12 3	18 7	263	217	0 49
20	115 Tauri	6	6 20	12 21	66	37	7 31	13 32	290	243	1 11
21	26 Geminorum	5½	11 54	17 50	112	58	12 46	18 42	264	212	0 52
22	W. vii. 685	6	4 30	10 23	81	132	5 42	11 35	287	327	1 12
24	ξ Leonis	5½	4 2	9 47	190	243	Star 1'.4	south of	D's	limb.	
25	48 Leonis	5½	6 52	12 33	198	246	Star 4'.5	south of	D's	limb.	
25	37 Sextantis	6½	13 9	18 49	51	10	13 41	19 21	357	312	0 32
26	τ Leonis	5	6 0	11 37	190	241	6 9	11 45	206	256	0 9
27	JUPITER		9 5	14 37	24	341	Star 3'.0	north of	D's	limb.	
29	κ Virginis	4½	11 16	16 40	122	158	12 35	17 59	289	311	1 19

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emerision below the horizon of Washington.



## FOR WASHINGTON MEAN NOON.

Date.	$k$	$i$	$\theta$	$L$	Date.	$k$	$i$	$\theta$	$L$
Jan. 1	0.025	161.8	330.3	6.3	July 0	0.988	12.8	343.0	61.5
6	0.037	157.7	182.1	8.7	5	0.935	29.6	358.8	52.6
11	0.193	127.8	188.9	33.7	10	0.865	43.2	6.4	44.6
16	0.378	104.7	184.6	45.0	15	0.791	54.4	11.7	38.8
21	0.519	87.8	180.9	42.9	20	0.721	63.8	16.0	35.0
26	0.629	75.0	177.0	32.8	25	0.653	72.2	19.3	32.8
31	0.710	65.2	173.0	33.7	30	0.585	80.2	22.1	31.8
Feb. 5	0.771	57.1	168.8	30.5	Aug. 4	0.514	88.4	24.6	31.5
10	0.820	50.2	164.5	28.4	9	0.435	97.5	26.9	31.4
15	0.861	43.8	160.3	27.5	14	0.344	108.3	29.5	30.4
20	0.892	37.8	155.0	27.7	19	0.241	121.2	32.8	26.9
25	0.929	31.0	151.4	29.3	24	0.127	138.2	38.2	18.1
Mar. 2	0.958	23.6	146.2	32.2	29	0.040	157.0	52.2	7.0
7	0.983	15.0	137.7	37.0	Sept. 3	0.009	169.1	138.4	1.8
12	0.998	5.2	98.5	44.3	8	0.079	147.3	189.8	15.3
17	0.990	11.7	351.3	54.1	13	0.256	119.2	199.5	43.1
22	0.936	29.2	338.0	64.5	18	0.475	92.8	204.2	63.7
27	0.820	50.2	334.8	70.4	23	0.691	67.5	207.8	69.1
Apr. 1	0.648	72.8	333.7	66.8	28	0.847	46.1	211.1	61.5
6	0.456	95.0	333.2	54.6	Oct. 3	0.938	28.9	214.2	52.6
11	0.283	115.7	332.7	38.7	8	0.981	15.7	218.4	40.6
16	0.143	135.5	331.4	22.2	13	0.997	5.6	257.9	33.7
21	0.047	154.8	328.3	8.1	18	0.999	3.4	359.8	29.2
26	0.005	171.7	305.4	0.9	23	0.992	10.6	18.9	26.5
May 1	0.012	167.2	159.1	2.2	28	0.979	16.7	21.3	25.1
6	0.065	150.5	153.5	10.1	Nov. 2	0.961	22.9	21.1	24.9
11	0.142	135.7	151.7	18.8	7	0.937	29.1	19.6	25.8
16	0.229	122.9	152.5	25.7	12	0.905	35.1	17.2	27.9
21	0.318	111.3	153.3	30.5	17	0.862	43.7	14.3	31.4
26	0.409	100.5	154.6	34.3	22	0.800	53.1	11.2	36.7
31	0.502	89.8	156.7	38.2	27	0.709	65.3	7.8	43.8
June 5	0.597	78.8	159.5	42.9	Dec. 2	0.576	81.3	4.5	51.3
10	0.720	63.8	163.4	50.6	7	0.386	103.2	4.4	52.1
15	0.838	47.5	168.8	58.8	12	0.163	132.3	357.9	32.9
20	0.939	28.5	177.3	65.9	17	0.012	167.4	335.2	3.1
25	0.994	8.6	203.3	67.2	22	0.057	152.4	202.1	13.4
30	0.988	12.8	343.0	61.5	27	0.241	121.2	194.5	40.8
					32	0.434	97.6	191.1	48.9

## NOTATION.

$k$ , the ratio of the illuminated portion of the apparent disk to the entire apparent disk considered as the superficies of a circle.

$i$ , the angle between the sun and earth, as seen from the planet.

$\theta$ , the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

$L$ , the brilliancy of the disk. The unit of  $L$  is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the sun, and illuminated by the latter as the mean disk of the planet is illuminated.

## FOR WASHINGTON MEAN NOON.

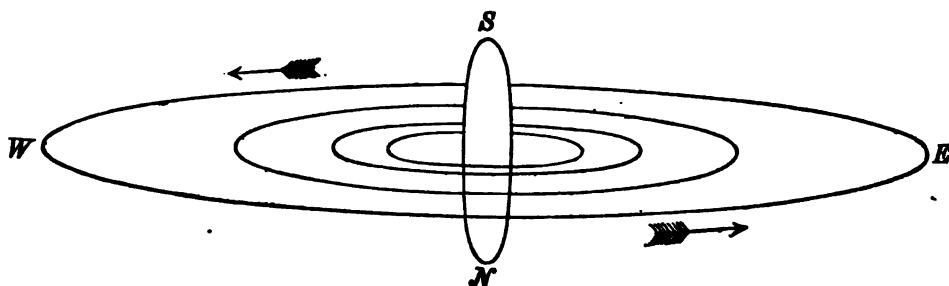
Date.	<i>k</i>	<i>i</i>	$\theta$	<i>L</i>	Date.	<i>k</i>	<i>i</i>	$\theta$	<i>L</i>
Jan. 1	0.867	42.7	190.0	63.5	July 0	0.963	22.2	5.5	50.3
6	0.877	40.9	187.2	61.9	5	0.956	24.1	7.9	50.9
11	0.887	39.1	184.3	60.3	10	0.949	26.1	10.2	51.6
16	0.897	37.4	181.3	58.9	15	0.941	28.1	12.3	52.4
21	0.906	35.7	178.1	57.6	20	0.932	30.2	14.2	53.2
26	0.915	33.9	175.0	56.4	25	0.923	32.2	15.9	54.1
31	0.923	32.2	171.9	55.3	30	0.914	34.2	17.5	55.0
Feb. 5	0.931	30.5	168.9	54.3	Aug. 4	0.904	36.1	18.7	56.1
10	0.938	28.8	166.0	53.3	9	0.894	38.1	19.8	57.3
15	0.945	27.1	163.3	52.4	14	0.883	40.1	20.7	58.6
20	0.951	25.4	160.7	51.5	19	0.872	42.0	21.4	60.0
25	0.957	23.8	158.3	50.8	24	0.860	44.0	21.9	61.4
Mar. 2	0.963	22.1	156.2	50.1	29	0.848	45.9	22.1	63.0
7	0.968	20.4	154.1	49.5	Sept. 3	0.836	47.8	22.1	64.7
12	0.973	18.8	152.3	49.0	8	0.823	49.8	21.9	66.5
17	0.978	17.1	150.7	48.5	13	0.811	51.7	21.5	68.5
22	0.982	15.4	149.4	48.0	18	0.797	53.6	20.8	70.8
27	0.986	13.7	148.2	47.6	23	0.783	55.5	19.9	73.2
Apr. 1	0.989	12.0	147.2	47.3	28	0.769	57.5	18.7	75.8
6	0.992	10.2	146.2	47.1	Oct. 3	0.754	59.5	17.3	78.7
11	0.995	8.4	145.0	46.9	8	0.740	61.4	15.7	81.8
16	0.996	6.7	143.6	46.7	13	0.724	63.4	13.9	85.3
21	0.998	4.9	141.0	46.6	18	0.709	65.4	11.9	89.1
26	0.999	3.3	135.4	46.6	23	0.692	67.4	9.8	93.2
May 1	1.000	1.8	114.6	46.6	28	0.675	69.5	7.5	97.6
6	1.000	1.4	34.7	46.6	Nov. 2	0.657	71.7	5.1	102.5
11	0.999	2.9	3.1	46.7	7	0.639	73.9	2.6	107.9
16	0.998	4.5	352.8	46.9	12	0.620	76.1	0.2	113.8
21	0.997	6.3	351.2	47.1	17	0.600	78.4	357.7	120.3
26	0.995	8.2	351.2	47.3	22	0.580	80.8	355.3	127.5
31	0.992	10.2	352.4	47.6	27	0.558	83.4	353.0	135.1
June 5	0.989	12.2	354.1	47.9	Dec. 2	0.534	86.1	350.8	143.5
10	0.985	14.2	356.1	48.3	7	0.510	88.8	348.7	152.6
15	0.980	16.2	358.3	48.7	12	0.484	91.8	346.8	162.4
20	0.975	18.2	0.7	49.2	17	0.457	95.0	345.1	172.9
25	0.970	20.2	3.1	49.7	22	0.427	98.5	343.4	183.8
30	0.963	22.2	5.5	50.3	27	0.396	102.1	341.9	194.6
					32	0.361	106.1	340.5	204.6

The satellites of Mars can probably not be observed during 1885, the planet not being in opposition that year.

#### THE APPARENT DISK OF MARS.

1885, January	1	0.974
January	31	1.000
March	2	0.999
April	1	0.996
May	1	0.989
May	31	0.980
June	30	0.969
July	30	0.954
August	29	0.938
September	28	0.922
October	28	0.907
November	27	0.900
December	27	0.910

The numbers which represent the apparent disk are the versed sines of the illuminated portion divided by the apparent diameter, or the ratio of the apparent illuminated disk to the entire disk.



APPARENT ORBITS OF THE SATELLITES OF JUPITER IN 1885,  
AS SEEN IN AN INVERTING TELESCOPE.

(The vertical scale is five times the horizontal one.)

The object of this figure is to facilitate the identification of the satellites in cases where the diagrams of configurations do not suffice for that purpose: reference to the above diagram enables one to identify the inner and outer satellite of the pair. The central, vertical ellipse represents the disk of Jupiter, elongated five times in the vertical direction to correspond to the representation of the orbits of the satellites.

Facing each page of the phenomena of Jupiter's satellites, pages 456—474, is the page of diagrams of configurations, for the same month. The light disks  $\bigcirc$  in the vertical row in the middle of the page represent the relative position of Jupiter each day. The dots adjacent in the same horizontal space represent the positions of the several satellites on the same day, at the hour and minute of Washington mean time indicated above the diagrams. The latitudes of the satellites are always considered zero in constructing the diagrams, except where two or more satellites chance to be at nearly the same distance from the planet, when they are placed one above the other according to their apparent latitudes. The numerals designating the satellites are placed on the right or left hand side of the dot, according as the motion of the satellite, for the time of the configuration, is toward the east or toward the west—the motion being always toward the numeral. Frequently, at the epoch of the configuration, one or more satellites will be invisible, being projected on the disk of the planet: this phenomenon is indicated by a light disk  $\bigcirc$  at the left hand side of the page. Frequently, also, one or more satellites will be invisible, being concealed in occultation behind the disk, or eclipsed in the shadow of the planet: this phenomenon is indicated by a dark disk  $\bullet$  at the right hand side of the page. In both cases, the annexed numeral serves to point out which satellite is thus rendered invisible.

When an observation is made at a different hour from that for which the diagram is constructed, the motion of the satellite during the interval may be judged by transferring its given position to the above diagram, and estimating its motion during the elapsed interval on the above diagram of the orbits, by means of the following table of the periods:—

#### MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s	=	d
I.	1	18	28	35.945	=	1.76986048
II.	3	13	17	53.735	=	3.55409416
III.	7	3	59	35.854	=	7.16638720
IV.	16	18	5	6.928	=	16.75355241

## WASHINGTON MEAN TIMES OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE I.

Jan.	0	h m 15 3.8	Mar.	19	h m 10 13.4	June	5	h m 6 44.3	Oct.	16	h m 2 23.4		
	2	9 30.6		21	4 39.9		7	1 13.7		17	20 53.4		
	4	3 57.3		22	23 6.4		8	19 43.1		19	15 23.5		
	5	22 24.0		24	17 33.0		10	14 12.6		21	9 53.4		
	7	16 50.6		26	11 59.7		12	8 42.1		23	4 23.4		
	9	11 17.2		28	6 26.5		14	3 11.7		24	22 53.2		
	11	5 43.6		30	0 53.3		15	21 41.2		26	17 23.2		
	13	0 10.0	Apr.	31	19 20.2		17	16 10.9		28	11 53.0		
	14	18 36.3		2	13 47.1		19	10 40.5		30	6 22.8		
	16	13 2.6		4	8 14.2		21	5 10.3	Nov.	1	0 52.5		
	18	7 28.9		6	2 41.3		22	23 40.1		2	19 22.2		
	20	1 55.1		7	21 8.5		24	18 9.9		4	13 51.9		
	21	20 21.4		9	15 35.7		26	12 39.7		6	8 21.6		
	23	14 47.5		11	10 3.1		28	7 9.6		8	2 51.2		
	25	9 13.6		13	4 30.5		30	1 39.5		9	21 20.9		
	27	3 39.7		14	22 58.0	July	1	20 9.4		11	15 50.4		
	28	22 5.6		16	17 25.5			3	14 39.3		13	10 19.9	
Feb.	30	16 31.6		18	11 53.1			5	9 9.3		15	4 49.3	
	1	10 57.6		20	6 20.7			7	3 39.2		16	23 18.8	
	3	5 23.5		22	0 48.5		8	22 9.1		18	17 48.2		
	4	23 49.4		23	19 16.3		10	16 39.2		20	12 17.7		
	6	18 15.3		25	13 44.3		12	11 9.3		22	6 46.9		
	8	12 41.1		27	8 12.2		14	5 39.4		24	1 16.2		
	10	7 6.9		29	2 40.3		16	0 9.5		25	19 45.3		
	12	1 32.8		30	21 8.4		17	18 39.5		27	14 14.6		
	13	19 58.7	May	2	15 36.7		19	13 9.7		29	8 43.6		
	15	14 24.5			4	10 4.9		21	7 39.8	Dec.	1	3 12.8	
	17	8 50.3			6	4 33.3		23	2 10.1			2	21 41.7
	19	3 16.1			7	23 1.6		24	20 40.3			4	16 10.8
	20	21 42.0		9	17 30.1		26	15 10.5			6	10 39.7	
	22	16 7.8		11	11 58.7		28	9 40.7		8	5 8.6		
	24	10 33.7		13	6 27.3		30	4 11.1		9	23 37.3		
	26	4 59.6		15	0 55.9		31	22 41.3		11	18 6.2		
Mar.	27	23 25.5		16	19 24.6					13	12 34.8		
	1	17 51.5		18	13 53.4					15	7 3.3		
	3	12 17.5		20	8 22.3	Oct.	0	3 52.3		17	1 31.9		
	5	6 43.6		22	2 51.2			1	22 22.6		18	20 0.5	
	7	1 9.7		23	21 20.2			3	16 52.7		20	14 28.9	
	8	19 35.8		25	15 49.1			5	11 22.9		22	8 57.3	
	10	14 2.0		27	10 18.2		7	5 53.0		24	3 25.6		
	12	8 28.1		29	4 47.3		9	0 23.2		25	21 53.9		
	14	2 54.4		30	23 16.5		10	18 53.2		27	16 22.1		
	15	21 20.7	June	1	17 45.7		12	13 23.3		29	10 50.2		
	17	15 47.0		3	12 15.0		14	7 53.3		31	5 18.3		



## WASHINGTON MEAN TIMES OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE II.

Jan.	2	h m 10 45.8	Mar.	21	h m 11 58.6	June	7	h m 15 35.0	Oct.	17	h m 6 42.6
	5	23 56.8		25	1 8.3		11	4 55.2		20	20 5.6
	9	13 8.5		28	14 19.1		14	18 15.8		24	9 28.5
	13	2 18.4		1	3 29.9		18	7 36.6		27	22 51.2
	16	15 29.0		4	16 41.7		21	20 57.8		31	12 13.9
Feb.	20	4 38.0	Apr.	8	5 53.5	July	25	10 19.3	Nov.	4	1 36.2
	23	17 47.7		11	19 6.3		28	23 40.9		7	14 58.5
	27	6 56.0		15	8 19.2		2	13 2.7		11	4 20.3
	30	20 5.0		18	21 33.1		6	2 24.8		14	17 42.3
	3	9 12.6		22	10 47.0		9	15 47.0		18	7 3.7
Mar.	6	22 21.0	May	26	0 1.9	Sept.	13	5 9.4	Dec.	21	20 25.2
	10	11 23.2		29	13 17.0		16	18 32.0		25	9 46.0
	14	0 36.4		3	2 32.8		20	7 54.7		28	23 6.9
	17	13 43.4		6	15 48.9		23	21 17.6		2	12 27.0
	21	2 51.4		10	5 5.8		27	10 40.6		6	1 47.2
Mar.	24	15 58.5	June	13	18 22.9	Oct.	31	0 3.7	Nov.	9	15 6.5
	28	5 6.7		17	7 40.7					13	4 26.0
	3	18 14.2		20	20 58.7		29	11 45.4		16	17 44.4
	7	7 22.8		24	10 17.3		3	1 9.1		20	7 3.0
	10	20 30.8		27	23 36.1		6	14 32.6		23	20 20.6
	14	9 40.0	June	31	12 55.4		10	3 56.0		27	9 38.3
	17	22 48.8		4	2 15.0		13	17 19.3		30	22 55.0

## SATELLITE III.

		h m		h m		h m		h m
Jan.	4	8 3.9	Mar.	31	0 15.4	June	24	23 20.6
	11	11 34.2	Apr.	7	3 47.7	July	2	3 37.5
	18	14 59.7		14	7 24.5		9	7 56.5
	25	18 21.5		21	11 6.2		16	12 17.8
Feb.	1	21 40.2		28	14 52.1		23	16 40.5
	9	0 56.9	May	5	18 42.2		30	21 5.1
	16	4 12.8		12	22 36.5			
	23	7 28.4		20	2 35.0			
Mar.	2	10 45.4		27	6 37.9			
	9	14 3.4	June	3	10 44.0			
	16	17 24.0		10	14 53.7	Sept.	26	8 37.9
	23	20 47.7		17	19 5.8	Oct.	3	13 3.6

## SATELLITE IV.

		h m		h m		h m		h m			
Jan.	16	20 25.7	Apr.	26	13 50.7	Aug.	5	8 6.9	Oct.	11	18 17.9
Feb.	2	11 1.0	May	13	7 11.7					28	14 32.0
	19	1 9.7		30	1 24.1				Nov.	14	10 24.2
Mar.	7	15 20.4	June	15	20 20.3				Dec.	1	5 45.3
	24	5 59.6	July	2	15 51.9					18	0 26.2
	9	21 26.8		19	11 49.7	Sept.	24	21 48.8		34	[18 18.3]

## WASHINGTON MEAN TIME.

## JANUARY.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	10	7		I. *Sh. In.	11	7	23		II. Sh. Eg.	21	23	12		II. Sh. Eg.	21	23	12		II. Sh. Eg.
	11	7		I. *Tr. In.		9	6		II. *Tr. Eg.	22	0	12		III. Sh. In.	22	0	12		III. Sh. In.
	12	27		I. *Sh. Eg.		13	23		III. *Oc. Re.		0	31		III. Tr. Eg.		0	31		III. Tr. Eg.
	13	27		I. *Tr. Eg.	12	0	59		I. Sh. In.		2	49		III. Tr. In.		2	49		III. Tr. In.
2	7	18	7.0	II. Ec. Dis.		1	48		I. Tr. In.		3	52		III. Sh. Eg.		3	52		III. Sh. Eg.
	7	23	54.8	I. Ec. Dis.		3	19		I. Sh. Eg.		6	24		III. Tr. Eg.		6	24		III. Tr. Eg.
	10	40		I. *Oc. Re.		4	8		I. Tr. Eg.		15	49		I. *Sh. In.		15	49		I. *Sh. In.
	12	13		II. *Oc. Re.		22	13	35.3	I. Ec. Dis.		16	27		I. *Tr. In.		16	27		I. *Tr. In.
3	4	36		I. Sh. In.		23	11	52.1	II. Ec. Dis.		18	9		I. *Sh. Eg.		18	9		I. *Sh. Eg.
	5	34		I. Tr. In.	13	1	20		I. Oc. Re.		18	47		I. Tr. Eg.		18	47		I. Tr. Eg.
	6	56		I. Sh. Eg.		3	46		II. Oc. Re.	23	13	3	31.0	I. *Ec. Dis.		13	3	31.0	I. *Ec. Dis.
	7	54		I. Tr. Eg.		19	27		I. Sh. In.		15	6	54.1	II. *Ec. Dis.		15	6	54.1	II. *Ec. Dis.
4	1	52	10.1	I. Ec. Dis.		20	15		I. Tr. In.		15	57		I. *Oc. Re.		15	57		I. *Oc. Re.
	1	53		II. Sh. In.		21	47		I. Sh. Eg.		19	15		II. Oc. Re.		19	15		II. Oc. Re.
	2	25	16.8	III. Ec. Dis.		22	34		I. Tr. Eg.	24	10	17		I. *Sh. In.		10	17		I. *Sh. In.
	3	51		II. Tr. In.	14	16	41	53.6	I. *Ec. Dis.		10	53		I. *Tr. In.		10	53		I. *Tr. In.
	4	49		II. Sh. Eg.		17	42		II. *Sh. In.		12	37		I. *Sh. Eg.		12	37		I. *Sh. Eg.
	5	7		I. Oc. Re.		19	19		II. Tr. In.		13	13		I. *Tr. Eg.		13	13		I. *Tr. Eg.
	5	57	2.8	III. Ec. Re.		19	46		I. Oc. Re.		18	27		IV. Sh. In.		18	27		IV. Sh. In.
	6	16		III. Oc. Dis.		20	13		III. Sh. In.		23	15		IV. Sh. Eg.		23	15		IV. Sh. Eg.
	6	46		II. Tr. Eg.		20	38		II. Sh. Eg.	25	0	1		IV. Tr. In.		0	1		IV. Tr. In.
	9	52		III. *Oc. Re.		22	15		II. Tr. Eg.		4	31		IV. Tr. Eg.		4	31		IV. Tr. Eg.
	23	4		I. Sh. In.		23	25		III. Tr. In.		7	31	50.4	I. Ec. Dis.		7	31	50.4	I. Ec. Dis.
5	0	1		I. Tr. In.		23	54		III. Sh. Eg.		9	33		II. *Sh. In.		9	33		II. *Sh. In.
	1	24		I. Sh. Eg.	15	3	0		III. Tr. Eg.		10	23		I. *Oc. Re.		10	23		I. *Oc. Re.
	2	21		I. Tr. Eg.		13	55		I. *Sh. In.		10	43		II. *Tr. In.		10	43		II. *Tr. In.
	20	20	26.0	I. Ec. Dis.		14	42		I. *Tr. In.		12	29		II. *Sh. Eg.		12	29		II. *Sh. Eg.
	20	35	38.0	II. Ec. Dis.		16	15		I. *Sh. Eg.		13	38		II. *Tr. Eg.		13	38		II. *Tr. Eg.
	23	34		I. Oc. Re.		17	1		I. *Tr. Eg.		14	19	11.5	III. *Ec. Dis.		14	19	11.5	III. *Ec. Dis.
6	1	25		II. Oc. Re.	16	10	59	29.7	IV. *Ec. Dis.		20	9		III. Oc. Re.		20	9		III. Oc. Re.
	17	33		I. *Sh. In.		11	10	13.3	I. *Ec. Dis.	26	4	45		I. Sh. In.		4	45		I. Sh. In.
	18	28		I. *Tr. In.		12	30	33.9	II. *Ec. Dis.		5	19		I. Tr. In.		5	19		I. Tr. In.
	19	53		I. Sh. Eg.		14	12		I. *Oc. Re.		7	6		I. Sh. Eg.		7	6		I. Sh. Eg.
	20	48		I. Tr. Eg.		15	37	43.9	IV. *Ec. Re.		7	39		I. Tr. Eg.		7	39		I. Tr. Eg.
7	14	48	43.4	I. *Ec. Dis.		16	57		II. *Oc. Re.	27	2	0	11.0	I. Ec. Dis.		2	0	11.0	I. Ec. Dis.
	15	9		II. *Sh. In.		18	10		IV. *Oc. Dis.		4	24	33.8	II. Ec. Dis.		4	24	33.8	II. Ec. Dis.
	16	15		III. *Sh. In.		22	41		IV. Oc. Re.		4	49		I. Oc. Re.		4	49		I. Oc. Re.
	17	1		II. *Tr. In.	17	8	23		I. Sh. In.		8	24		II. *Oc. Re.		8	24		II. *Oc. Re.
	18	0		I. *Oc. Re.		9	8		I. *Tr. In.		23	14		I. Sh. In.		23	14		I. Sh. In.
	18	5		II. *Sh. Eg.		10	43		I. *Sh. Eg.		23	45		I. Tr. In.		23	45		I. Tr. In.
	19	56		II. Tr. Eg.		11	27		I. *Tr. Eg.	28	1	34		I. Sh. Eg.		1	34		I. Sh. Eg.
	19	56		III. Sh. Eg.	18	5	38	31.1	I. Ec. Dis.		2	5		I. Tr. Eg.		2	5		I. Tr. Eg.
	19	57		III. Tr. In.		6	59		II. Sh. In.		20	28	32.5	I. Ec. Dis.		20	28	32.5	I. Ec. Dis.
	23	32		III. Tr. Eg.		8	27		II. Tr. In.		22	49		II. Sh. In.		22	49		II. Sh. In.
8	0	29		IV. Sh. In.		8	39		I. Oc. Re.		23	15		I. Oc. Re.		23	15		I. Oc. Re.
	5	19		IV. Sh. Eg.		9	55		II. *Sh. Eg.		23	50		II. Tr. In.		23	50		II. Tr. In.
	9	3		IV. *Tr. In.		10	21	22.2	III. *Ec. Dis.	29	1	45		II. Sh. Eg.		1	45		II. Sh. Eg.
	12	2		I. *Sh. In.		11	23		II. *Tr. Eg.		2	45		II. Tr. Eg.		2	45		II. Tr. Eg.
	12	55		I. *Tr. In.		16	47		III. *Oc. Re.		4	10		III. Sh. In.		4	10		III. Sh. In.
	13	34		IV. *Tr. Eg.	19	2	52		I. Sh. In.		6	10		III. Tr. In.		6	10		III. Tr. In.
	14	22		I. *Sh. Eg.		3	35		I. Tr. In.		7	50		III. *Sh. Eg.		7	50		III. *Sh. Eg.
	15	15		I. *Tr. Eg.		5	12		I. Sh. Eg.		9	45		III. *Tr. Eg.		9	45		III. *Tr. Eg.
9	9	17	1.6	I. *Ec. Dis.		5	54		I. *Tr. Eg.		17	43		I. *Sh. In.		17	43		I. *Sh. In.
	9	54	18.0	II. *Ec. Dis.	20	0	6	49.7	I. Ec. Dis.		18	12		I. *Tr. In.		18	12		I. *Tr. In.
	12	27		I. *Oc. Re.		1	48	10.7	II. Ec. Dis.		20	3		I. Sh. Eg.		20	3		I. Sh. Eg.
	14	36		II. *Oc. Re.		3	5		I. Oc. Re.		20	31		I. Tr. Eg.		20	31		I. Tr. Eg.
10	6	30		I. Sh. In.		6	6		II. Oc. Re.	30	14	56	56.1	I. *Ec. Dis.		14	56	56.1	I. *Ec. Dis.
	7	22		I. Tr. In.		21	20		I. Sh. In.		17	41		I. *Oc. Re.		17	41		I. *Oc. Re.
	8	50		I. Sh. Eg.		22	1		I. Tr. In.		17	43	18.2	II. *Ec. Dis.		17	43	18.2	II. *Ec. Dis.
	9	41		I. *Tr. Eg.		23	40		I. Sh. Eg.		21	33		II. Oc. Re.		21	33		II. Oc. Re.
11	3	45	18.1	I. Ec. Dis.	21	0	20		I. Tr. Eg.	31	12	12		I. *Sh. In.		12	12		I. *Sh. In.
	4	26		II. Sh. In.		18	35	9.4	I. Ec. Dis.		12	38		I. *Tr. In.		12	38		I. *Tr. In.
	6	10		II. Tr. In.		20	16		II. Sh. In.		14	31		I. *Sh. Eg.		14	31		I. *Sh. Eg.
	6	23	35.6	III. Ec. Dis.		21	31		I. Oc. Re.		14	57		I. *Tr. Eg.		14	57		I. *Tr. Eg.
	6	53		I. Oc. Re.		21	35		II. Tr. In.										

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

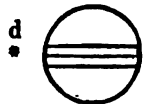
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

JANUARY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



III.



II.



IV.

*Configurations at 13<sup>h</sup> 0<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1	○ 1'		2'		○		4'	
2		3'			○ 2'	1'		4'
3			3'	1'	○	2'		4'
4				2'	○	3'	1'	4'
5				2'	○		3'	4'
6					○	1'	2'	3'
7				1'	○	2'	3'	4'
8	○ 1'	○ 4'		2'	○			
9		3'	4'		○	1'		2'
10		4'	3'	1'	○	2'		
11		4'		2'	○	3'	1'	
12		4'		2'	○		3'	
13		4'			○	1'	2'	3'
14		4'		1'	○	2'	3'	
15			4'	2'	○	1'		
16		3'	2'	4'	○			1'
17			3'	1'	○	4'	2'	
18				2'	○	1'	4'	3'
19				2'	○	3'		4'
20					○	1'	3'	4'
21				1'	○	2'	3'	4'
22				2'	○	1'		4'
23			3'	2'	○		4'	
24	○ 1'		3'		○	4'	2'	
25	○ 2'			4'	○	1'		
26			4'	2'	○	3'		
27			4'		○	2'	1'	3'
28			4'		○	2'	3'	
29			4'	2'	○	1'		
30			4'	3'	○		2'	1'
31	○ 1'		4'	3'	○	2'		

## WASHINGTON MEAN TIME.

## FEBRUARY.

d	h	m	s		d	h	m	s		d	h	m	s				
1	9	25	17.2	I. * Ec.	Dis.	10	12	56	II. * Oc.	Re.	19	19	37	III. Tr.	Eg.		
	12	6		II. * Sh.	In.		14	21	IV. * Tr.	In.		19	45	III. Sh.	Eg.		
	12	7		I. * Oc.	Re.		17	11	IV. * Sh.	Eg.		23	24	I. Tr.	In.		
	12	57		II. * Tr.	In.		18	52	IV. Tr.	Eg.		23	26	I. Sh.	In.		
	15	2		II. * Sh.	Eg.	11	3	3	I. Sh.	In.	20	1	43	I. Tr.	Eg.		
	15	52		II. * Tr.	Eg.		3	14	I. Tr.	In.		1	46	I. Sh.	Eg.		
	18	16	52.8	III. Ec.	Dis.		5	23	I. Sh.	Eg.		20	32	I. Oc.	Dis.		
	23	23		III. Oc.	Re.		5	33	I. Tr.	Eg.		22	52	44.8	I. Ec.	Re.	
2	4	59	31.9	IV. Ec.	Dis.	12	0	15	41.2	I. Ec.	Dis.	21	1	24	II. Oc.	Dis.	
	6	40		I. Sh.	In.		2	42	I. Oc.	Re.		4	25	15.1	II. Ec.	Re.	
	7	4		I. Tr.	In.		3	57	II. Sh.	In.		17	50		I. * Tr.	In.	
	9	0		I. * Sh.	Eg.		4	16	II. Tr.	In.		17	55		I. * Sh.	In.	
	9	23		I. * Tr.	Eg.		6	53	II. * Sh.	Eg.		20	9		I. Tr.	Eg.	
	13	16		IV. * Oc.	Re.		7	11	II. * Tr.	Eg.		20	14		I. Sh.	Eg.	
3	3	53	39.8	I. Ec.	Dis.		12	7	III. * Sh.	In.	22	14	58	I. * Oc.	Dis.		
	6	33		I. Oc.	Re.		12	45	III. * Tr.	In.		17	21	12.0	I. * Ec.	Re.	
	7	1	0.7	II. Ec.	Dis.		15	47	III. * Sh.	Eg.		19	36		II. Tr.	In.	
	10	40		II. * Oc.	Re.		16	21	III. * Tr.	Eg.		19	48		II. Sh.	In.	
4	1	9		I. Sh.	In.		21	31	I. Sh.	In.		22	31		II. Tr.	Eg.	
	1	30		I. Tr.	In.		21	40	I. Tr.	In.		22	44		II. Sh.	Eg.	
	3	28		I. Sh.	Eg.		23	51	I. Sh.	Eg.	23	5	40	III. Oc.	Dis.		
	3	49		I. Tr.	Eg.		23	59	I. Tr.	Eg.		9	41	20.0	III. * Ec.	Re.	
	22	22	2.6	I. Ec.	Dis.	13	18	44	9.0	I. Ec.	Dis.		12	16		I. * Tr.	In.
5	0	59		I. Oc.	Re.		21	8	I. Oc.	Re.		12	23		I. * Sh.	In.	
	1	23		II. Sh.	In.		22	56	15.3	II. Ec.	Dis.		14	35		I. * Tr.	Eg.
	2	4		II. Tr.	In.	14	2	4		II. Oc.	Re.		14	43		I. * Sh.	Eg.
	4	19		II. Sh.	Eg.		16	0	I. * Sh.	In.	24	9	24		I. * Oc.	Dis.	
	4	59		II. Tr.	Eg.		16	6	I. * Tr.	In.		11	49	41.4	I. * Ec.	Re.	
	8	9		III. * Sh.	In.		18	20	I. Sh.	Eg.		14	31		II. * Oc.	Dis.	
	9	29		III. * Tr.	In.		18	25	I. Tr.	Eg.		17	42	59.7	II. * Ec.	Re.	
	11	49		III. * Sh.	Eg.	15	13	12	33.9	I. * Ec.	Dis.	25	6	42		I. * Tr.	In.
	13	4		III. * Tr.	Eg.		15	34	I. * Oc.	Re.		6	52		I. * Sh.	In.	
	19	37		I. Sh.	In.		17	14	II. * Sh.	In.		9	1		I. * Tr.	Eg.	
	19	56		I. Tr.	In.		17	23	II. * Tr.	In.		9	11		I. * Sh.	Eg.	
	21	57		I. Sh.	Eg.		20	10	II. Sh.	Eg.	26	3	50		I. Oc.	Dis.	
	22	15		I. Tr.	Eg.		20	18	II. Tr.	Eg.		6	18	10.3	I. * Ec.	Re.	
6	16	50	28.2	I. * Ec.	Dis.	16	2	13	17.2	III. Ec.	Dis.		8	42		II. * Tr.	In.
	19	25		I. Oc.	Re.		6	0	III. Oc.	Re.		9	5		II. * Sh.	In.	
	20	19	45.5	II. Ec.	Dis.		10	29	I. * Sh.	In.		11	38		II. * Tr.	Eg.	
	23	49		II. Oc.	Re.		10	32	I. * Tr.	In.		12	1		II. * Sh.	Eg.	
7	14	6		I. * Sh.	In.		12	49	I. * Sh.	Eg.		19	16		III. Tr.	In.	
	14	22		I. * Tr.	In.		12	51	I. * Tr.	Eg.		20	4		III. Sh.	In.	
	16	25		I. * Sh.	Eg.	17	7	41	I. * Oc.	Dis.		22	53		III. Tr.	Eg.	
	16	41		I. * Tr.	Eg.		10	0	I. * Oc.	Re.		23	43		III. Sh.	Eg.	
8	11	18	51.6	I. * Ec.	Dis.		12	14	2.5	II. * Ec.	Dis.	27	1	8		I. Tr.	In.
	13	51		I. * Oc.	Re.		15	11	II. * Oc.	Re.		1	21		I. Sh.	In.	
	14	40		II. * Sh.	In.	18	4	57	I. Sh.	In.		3	27		I. Tr.	Eg.	
	15	10		II. * Tr.	In.		4	58	I. Tr.	In.		3	40		I. Sh.	Eg.	
	17	36		II. * Sh.	Eg.		7	17	I. * Sh.	Eg.		4	28		IV. Tr.	In.	
	18	5		II. Tr.	Eg.		7	17	I. * Tr.	Eg.		6	25		IV. * Sh.	In.	
	22	14	46.1	III. Ec.	Dis.		22	53	IV. Oc.	Dis.		9	2		IV. * Tr.	Eg.	
9	2	44		III. Oc.	Re.	19	2	6	I. Oc.	Dis.		11	8		IV. * Sh.	Eg.	
	8	34		I. * Sh.	In.		3	32	54.0	IV. Ec.	Re.		22	16		I. Oc.	Dis.
	8	48		I. * Tr.	In.		4	26	I. Oc.	Re.	28	0	46	43.0	I. Ec.	Re.	
	10	54		I. * Sh.	Eg.		6	29	II. * Tr.	In.		3	39		II. Oc.	Dis.	
	11	7		I. * Tr.	Eg.		6	31	II. * Sh.	In.		7	1	38.1	II. * Ec.	Re.	
10	5	47	16.4	I. Ec.	Dis.		9	24	II. * Tr.	Eg.		19	34		I. Tr.	In.	
	8	17		I. * Oc.	Re.		9	27	II. * Sh.	Eg.		19	49		I. Sh.	In.	
	9	37	30.2	II. * Ec.	Dis.		16	1	III. * Tr.	In.		21	53		I. Tr.	Eg.	
	12	25		IV. * Sh.	In.		16	6	III. * Sh.	In.		22	8		I. Sh.	Eg.	

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

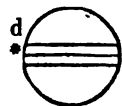
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

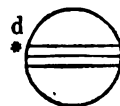
FEBRUARY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

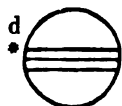
I.



III.



II.



IV.

*Configurations at 12<sup>h</sup> 0<sup>m</sup> for an Inverting Telescope.*

Day.	West.			East.		
1		·4	·3	○ 2·		·1 ●
2		·2	1·	○	·3	·4 ●
3				○ ·2	·1	·4 ·3
4			1·	○	2· 3·	·4
5	○ 3·		2·	○	1·	·4
6		3·	·2 ·1	○		·4
7		·3		○ 1·	·2	4·
8			·3	○ 2·		4· ·1 ●
9		2·	1·	○	·3	4·
10				○ 4·	·1	·3 ·2 ●
11			4· 1·	○	2· 3·	
12		4·	2·	○ 3·	·1	
13		4·	3· ·2 ·1	○		
14	4·	·3		○ 1·	·2	
15	·4		·3 ·1	○ 2·		
16	○ 1·	·4	2·	○	·3	
17		·4		·2 ○	·1	·3
18			·4 1·	○	2· 3·	
19			2·	○ 3·	·4 ·1	
20		3· ·2 ·1		○		·4
21		3·		○ 1·	·2	·4
22		·3	·1	○ 2·		·4
23		2·	1 ○ ·3			4·
24			·2 ○ ·1		·3	4·
25			1·	○	·2 3· 4·	
26			2·	○ 3·	·1 4·	
27		·3 1·	4·	○		
28		3· 4·		○	·1	

WASHINGTON MEAN TIME.											
MARCH.											
d	h	m	s			d	h	m	s		
1	16	42		I. * Oc.	Dis.	12	10	6	28.8	I. * Ec.	Re.
	19	15	12.7	I. Ec.	Re.		13	11		II. * Tr.	In.
	21	49		II. Tr.	In.		14	14		II. * Sh.	In.
	22	22		II. Sh.	In.		16	7		II. * Tr.	Eg.
2	0	45		II. Tr.	Eg.		17	10		II. Sh.	Eg.
	1	18		II. Sh.	Eg.	13	1	53		III. Tr.	In.
	8	57		III. * Oc.	Dis.		4	2		III. Sh.	In.
	13	40	8.6	III. * Ec.	Re.		4	37		I. Tr.	In.
	14	0		I. * Tr.	In.		5	9		I. Sh.	In.
	14	18		I. * Sh.	In.		5	30		III. Tr.	Eg.
	16	19		I. * Tr.	Eg.		6	56		I. * Tr.	Eg.
	16	37		I. * Sh.	Eg.		7	29		I. * Sh.	Eg.
3	11	8		I. * Oc.	Dis.		7	40		III. * Sh.	Eg.
	13	43	44.3	I. Ec.	Re.	14	1	45		I. Oc.	Dis.
	16	47		II. * Oc.	Dis.		4	35	6.4	I. Ec.	Re.
	20	19	24.3	II. Ec.	Re.		8	12		II. * Oc.	Dis.
4	8	26		I. * Tr.	In.		12	14	22.0	II. * Ec.	Re.
	8	46		I. * Sh.	In.		23	3		I. Tr.	In.
	10	45		I. * Tr.	Eg.		23	38		I. Sh.	In.
	11	6		I. * Sh.	Eg.	15	1	23		I. Tr.	Eg.
5	5	34		I. Oc.	Dis.		1	58		I. Sh.	Eg.
	8	12	15.2	I. * Ec.	Re.		18	50		IV. Tr.	In.
	10	56		II. * Tr.	In.		20	11		I. Oc.	Dis.
	11	39		II. * Sh.	In.		23	3	40.0	I. Ec.	Re.
	13	52		II. * Tr.	Eg.		23	27		IV. Tr.	Eg.
	14	35		II. * Sh.	Eg.	16	0	24		IV. Sh.	In.
	22	33		III. Tr.	In.		2	19		II. Tr.	In.
6	0	3		III. Sh.	In.		3	32		II. Sh.	In.
	2	10		III. Tr.	Eg.		5	5		IV. Sh.	Eg.
	2	52		I. Tr.	In.		5	15		II. Tr.	Eg.
	3	15		I. Sh.	In.		6	28		II. Sh.	Eg.
	3	41		III. Sh.	Eg.		15	35		III. * Oc.	Dis.
	5	11		I. Tr.	Eg.		17	30		I. Tr.	In.
	5	34		I. Sh.	Eg.		18	7		I. Sh.	In.
7	0	0		I. Oc.	Dis.		19	49		I. Tr.	Eg.
	2	40	50.4	I. Ec.	Re.		20	26		I. Sh.	Eg.
	5	55		II. Ec.	Dis.		21	36	47.7	III. Ec.	Re.
	9	38	0.7	II. Ec.	Re.	17	14	37		I. * Oc.	Dis.
	13	3		IV. * Oc.	Dis.		17	32	16.4	I. Ec.	Re.
	21	18		I. Tr.	In.		21	21		II. Oc.	Dis.
	21	30	48.8	IV. Ec.	Re.	18	1	32	10.6	II. Ec.	Re.
	21	43		I. Sh.	In.		11	56		I. * Tr.	In.
	23	37		I. Tr.	Eg.		12	36		I. * Sh.	In.
8	0	3		I. Sh.	Eg.		14	16		I. * Tr.	Eg.
	18	26		I. Oc.	Dis.		14	55		I. * Sh.	Eg.
	21	9	21.9	I. Ec.	Re.	19	9	4		I. * Oc.	Dis.
9	0	3		II. Tr.	In.		12	0	50.9	I. * Ec.	Re.
	0	57		II. Sh.	In.		15	28		II. * Tr.	In.
	2	59		II. Tr.	Eg.		16	49		II. Sh.	In.
	3	53		II. Sh.	Eg.		18	24		II. Tr.	Eg.
	12	15		III. * Oc.	Dis.		19	45		II. Sh.	Eg.
	15	44		I. * Tr.	In.	20	5	15		III. Tr.	In.
	16	12		I. * Sh.	In.		6	22		I. Tr.	In.
	17	38	26.6	III. Ec.	Re.		7	4		I. * Sh.	In.
	18	3		I. Tr.	Eg.		8	1		III. * Sh.	In.
	18	32		I. Sh.	Eg.		8	42		I. * Tr.	Eg.
10	12	52		I. * Oc.	Dis.		8	53		III. * Tr.	Eg.
	15	37	56.0	I. * Ec.	Re.		9	24		I. * Sh.	Eg.
	19	3		II. Oc.	Dis.		11	39		III. * Sh.	Eg.
	22	55	48.2	II. Ec.	Re.	21	3	30		I. Oc.	Dis.
	10	11		I. * Tr.	In.		6	29	30.5	I. Ec.	Re.
	10	40		I. * Sh.	In.		10	31		II. * Oc.	Dis.
	12	30		I. * Tr.	Eg.		14	50	41.2	II. * Ec.	Re.
	13	0		I. * Sh.	Eg.	22	0	49		I. Tr.	In.
12	7	18		I. * Oc.	Dis.		1	33		I. Sh.	In.
22	3	9		I. Tr.	Eg.	22	3	9		I. Sh.	In.
	3	52		I. Sh.	Eg.		3	52		I. Sh.	Eg.
	21	57		I. Oc.	Dis.	23	0	58	6.2	I. Ec.	Re.
	4	37		II. Tr.	In.		4	37		II. Tr.	In.
	6	7		II. Sh.	In.		6	7		II. Sh.	In.
	7	33		II. * Tr.	Eg.		7	33		II. * Tr.	Eg.
	9	3		II. * Sh.	Eg.		9	3		II. * Sh.	Eg.
	18	59		III. Oc.	Dis.		18	59		III. Oc.	Dis.
	19	16		I. Tr.	In.		19	16		I. Tr.	In.
	20	2		I. Sh.	In.		20	2		I. Sh.	In.
	21	36		I. Tr.	Eg.		21	36		I. Tr.	Eg.
	22	21		I. Sh.	Eg.	24	22	21		I. Sh.	Eg.
	1	35	1.7	III. Ec.	Re.		1	35		III. Ec.	Re.
	3	40		IV. Oc.	Dis.		3	40		IV. Oc.	Dis.
	8	19		IV. * Oc.	Re.		8	19		IV. * Oc.	Re.
	11	2	50.5	IV. * Ec.	Dis.		11	2	50.5	IV. * Ec.	Dis.
	15	29	38.1	IV. * Ec.	Re.		15	29	38.1	IV. * Ec.	Re.
	16	23		I. Oc.	Dis.		16	23		I. Oc.	Dis.
	19	26	44.8	I. Ec.	Re.		19	26	44.8	I. Ec.	Re.
	23	41		II. Oc.	Dis.		23	41		II. Oc.	Dis.
25	4	8	30.1	II. Ec.	Re.	25	4	8	30.1	II. Ec.	Re.
	13	43		I. * Tr.	In.		13	43		I. * Tr.	In.
	14	31		I. * Sh.	In.		14	31		I. * Sh.	In.
	16	3		I. Tr.	Eg.		16	3		I. Tr.	Eg.
	16	50		I. Sh.	Eg.		16	50		I. Sh.	Eg.
26	10	50		I. * Oc.	Dis.	26	10	50		I. * Oc.	Dis.
	13	55	21.2	I. * Ec.	Re.		13	55	21.2	I. * Ec.	Re.
	17	47		II. Tr.	In.		17	47		II. Tr.	In.
	19	24		II. Sh.	In.		19	24		II. Sh.	In.
	20	43		II. Tr.	Eg.		20	43		II. Tr.	Eg.
	22	20		II. Sh.	Eg.		22	20		II. Sh.	Eg.
27	8	10		I. * Tr.	In.	27	8	10		I. * Tr.	In.
	8	42		III. * Tr.	In.		8	42		III. * Tr.	In.
	8	59		I. * Sh.	In.		8	59		I. * Sh.	In.
	10	30		I. * Tr.	Eg.		10	30		I. * Tr.	Eg.
	11	18		I. * Sh.	Eg.		11	18		I. * Sh.	Eg.
	12	1		III. * Sh.	In.		12	1		III. * Sh.	In.
	12	20		III. * Tr.	Eg.		12	20		III. * Tr.	Eg.
	15	38		III. * Sh.	Eg.		15	38		III. * Sh.	Eg.
28	5	17		I. Oc.	Dis.	28	5	17		I. Oc.	Dis.
	8	24	2.7	I. * Ec.	Re.		8	24	2.7	I. * Ec.	Re.
	12	51		II. * Oc.	Dis.		12	51		II. * Oc.	Dis.
	17	26	56.8	II. Ec.	Re.		17	26	56.8	II. Ec.	Re.
29	2	37		I. Tr.	In.	29	2	37		I. Tr.	In.
	3	28		I. Sh.	In.		3	28		I. Sh.	In.
	4	57		I. Tr.	Eg.		4	57		I. Tr.	Eg.
	5	47		I. Sh.	Eg.		5	47		I. Sh.	Eg.
	23	43		I. Oc.	Dis.		23	43		I. Oc.	Dis.
30	2	52	40.1	I. Ec.	Re.	30	2	52	40.1	I. Ec.	Re.
	6	57		II. * Tr.	In.		6	57		II. * Tr.	In.
	8	42		II. * Sh.	In.		8	42		II. * Sh.	In.
	9	53		II. * Tr.	Eg.		9	53		II. * Tr.	Eg.
	11	38		II. * Sh.	Eg.		11	38		II. * Sh.	Eg.
	21	4		I. Tr.	In.		21	4		I. Tr.	In.
	21	57		I. Sh.	In.		21	57		I. Sh.	In.
	22	26		III. Oc.	Dis.		22	26		III. Oc.	Dis.
	23	24		I. Tr.	Eg.		23	24		I. Tr.	Eg.
31	0	16		I. Sh.	Eg.	31	0	16		I. Sh.	Eg.
	2	5		III. Oc.	Re.		2	5		III. Oc.	Re.
	2	5	56.2	III. Ec.	Dis.		2	5	56.2	III. Ec.	Dis.
	5	33	26.8	III. Ec.	Re.		5	33	26.8	III. Ec.	Re.
	18	10		I. Oc.	Dis.		18	10		I. Oc.	Dis.
	21	21	20.6	I. Ec.	Re.		21	21	20.6	I. Ec.	Re.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

## MARCH.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



III.



II.



IV.

*Configurations at 11<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1		4 <sup>.</sup>	3 <sup>.</sup>	1 <sup>.</sup>	○	2 <sup>.</sup>		
2		4 <sup>.</sup>		2 <sup>.</sup>	○	1 <sup>.</sup>		3 <sup>.</sup> ●
3		4 <sup>.</sup>		2 <sup>.</sup>	○		3 <sup>.</sup>	1 <sup>.</sup> ●
4		4 <sup>.</sup>		1 <sup>.</sup>	○	2 <sup>.</sup>	3 <sup>.</sup>	
5	○ 2 <sup>.</sup>	4 <sup>.</sup>			○	1 <sup>.</sup>	3 <sup>.</sup>	
6			4 <sup>.</sup> 2 <sup>.</sup>	1 <sup>.</sup>	○			
7			3 <sup>.</sup>	4 <sup>.</sup> 2 <sup>.</sup>	○	1 <sup>.</sup>		
8			3 <sup>.</sup>	1 <sup>.</sup>	○	2 <sup>.</sup>	4 <sup>.</sup>	
9			2 <sup>.</sup>	3 <sup>.</sup>	○	1 <sup>.</sup>		
10			2 <sup>.</sup>	1 <sup>.</sup>	○	3 <sup>.</sup>	4 <sup>.</sup>	
11	○ 1 <sup>.</sup>				○	2 <sup>.</sup>	3 <sup>.</sup>	4 <sup>.</sup>
12					○	3 <sup>.</sup>	4 <sup>.</sup>	
13			2 <sup>.</sup>	1 <sup>.</sup>	○		4 <sup>.</sup>	
14			3 <sup>.</sup>		○	2 <sup>.</sup>	1 <sup>.</sup>	4 <sup>.</sup>
15			3 <sup>.</sup>	1 <sup>.</sup>	○	4 <sup>.</sup>	2 <sup>.</sup>	
16			4 <sup>.</sup> 3 <sup>.</sup>		○	1 <sup>.</sup>		
17		4 <sup>.</sup>	2 <sup>.</sup>	1 <sup>.</sup>	○		3 <sup>.</sup>	
18		4 <sup>.</sup>			○	1 <sup>.</sup>	2 <sup>.</sup>	3 <sup>.</sup>
19		4 <sup>.</sup>			○	2 <sup>.</sup>	3 <sup>.</sup>	1 <sup>.</sup> ●
20		4 <sup>.</sup>	2 <sup>.</sup>	1 <sup>.</sup> 3 <sup>.</sup>	○			
21		4 <sup>.</sup>	3 <sup>.</sup>		○	1 <sup>.</sup>		2 <sup>.</sup> ●
22		4 <sup>.</sup> 3 <sup>.</sup>	1 <sup>.</sup>		○	2 <sup>.</sup>		
23			4 <sup>.</sup> 3 <sup>.</sup> 2 <sup>.</sup>		○	1 <sup>.</sup>		
24			2 <sup>.</sup> 1 <sup>.</sup>		○	4 <sup>.</sup>	3 <sup>.</sup>	
25					○	1 <sup>.</sup>	2 <sup>.</sup> 4 <sup>.</sup> 3 <sup>.</sup>	
26					○	2 <sup>.</sup>	3 <sup>.</sup>	4 <sup>.</sup> 1 <sup>.</sup> ●
27	○ 3 <sup>.</sup>		2 <sup>.</sup>	1 <sup>.</sup>	○			4 <sup>.</sup>
28			3 <sup>.</sup>	2 <sup>.</sup>	○	1 <sup>.</sup>		4 <sup>.</sup>
29			3 <sup>.</sup>	1 <sup>.</sup>	○		2 <sup>.</sup>	4 <sup>.</sup>
30				3 <sup>.</sup> 2 <sup>.</sup>	○	1 <sup>.</sup>		4 <sup>.</sup>
31				2 <sup>.</sup> 1 <sup>.</sup>	○	3 <sup>.</sup>	4 <sup>.</sup>	

# WASHINGTON MEAN TIME.

## APRIL.

d	h	m	s		d	h	m	s		d	h	m	s	
1	2	2		II. Oc. Dis.	10	15	8		I. Sh. Eg.	21	2	31		I. Tr. In.
	6	44	45.8	II. Ec. Re.		15	46		III. Tr. In.		3	41		I. Sh. In.
	9	50		IV. *Tr. In.		19	24		III. Tr. Eg.		4	51		I. Tr. Eg.
	14	31		IV. *Tr. Eg.		19	59		III. Sh. In.		6	0		I. Sh. Eg.
	15	30		I. Tr. In.		23	36		III. Sh. Eg.		9	16		III. *Oc. Dis.
	16	25		I. Sh. In.	11	8	53		I. *Oc. Dis.		12	56		III. *Oc. Re.
	17	50		I. Tr. Eg.		12	13	28.0	I. *Ec. Re.		14	4	46.1	III. *Ec. Dis.
	18	25		IV. Sh. In.		17	38		II. Oc. Dis.		17	30	52.5	III. Ec. Re.
	18	44		I. Sh. Eg.		22	39	14.2	II. Ec. Re.		23	39		I. Oc. Dis.
	23	2		IV. Sh. Eg.	12	6	13		I. Tr. In.	22	3	5	46.6	I. Ec. Re.
2	12	37		I. *Oc. Dis.		7	17		I. *Sh. In.		9	19		II. *Oc. Dis.
	15	49	58.4	I. Ec. Re.		8	33		I. *Tr. Eg.		14	33	0.5	II. Ec. Re.
	20	8		II. Tr. In.		9	36		I. *Sh. Eg.		20	59		I. Tr. In.
	22	0		II. Sh. In.	13	3	20		I. Oc. Dis.		22	9		I. Sh. In.
	23	4		II. Tr. Eg.		6	42	8.4	I. Ec. Re.		23	19		I. Tr. Eg.
3	0	56		II. Sh. Eg.		11	44		II. *Tr. In.	23	0	29		I. Sh. Eg.
	9	57		I. *Tr. In.		13	54		II. *Sh. In.		18	6		I. Oc. Dis.
	10	54		I. *Sh. In.		14	40		II. Tr. Eg.		21	34	28.2	I. Ec. Re.
	12	11		III. *Tr. In.		16	50		II. Sh. Eg.	24	3	25		II. Tr. In.
	12	17		I. *Tr. Eg.	14	0	40		I. Tr. In.		5	48		II. Sh. In.
	13	13		I. *Sh. Eg.		1	46		I. Sh. In.		6	21		II. Tr. Eg.
	15	50		III. Tr. Eg.		3	0		I. Tr. Eg.		8	44		II. *Sh. Eg.
	16	0		III. Sh. In.		4	5		I. Sh. Eg.		15	27		I. Tr. In.
	19	37		III. Sh. Eg.		5	35		III. Oc. Dis.		16	38		I. Sh. In.
4	7	4		I. *Oc. Dis.		9	14		III. *Oc. Re.		17	47		I. Tr. Eg.
	10	18	42.0	I. *Ec. Re.		10	4	47.2	III. *Ec. Dis.		18	57		I. Sh. Eg.
	15	14		II. *Oc. Dis.		13	31	22.8	III. *Ec. Re.		23	7		III. Tr. In.
	20	3	8.2	II. Ec. Re.		21	48		I. Oc. Dis.	25	2	45		III. Tr. Eg.
5	4	24		I. Tr. In.	15	1	10	52.6	I. Ec. Re.		3	57		III. Sh. In.
	5	23		I. Sh. In.		6	51		II. Oc. Dis.		7	33		III. *Sh. Eg.
	6	44		I. Tr. Eg.		11	57	1.9	II. *Ec. Re.		12	34		I. *Oc. Dis.
	7	42		I. *Sh. Eg.		19	8		I. Tr. In.		16	3	16.1	I. Ec. Re.
6	1	31		I. Oc. Dis.		20	15		I. Sh. In.		22	34		II. Oc. Dis.
	4	47	21.0	I. Ec. Re.		21	28		I. Tr. Eg.	26	3	51	6.8	II. Ec. Re.
	9	19		II. *Tr. In.		22	34		I. Sh. Eg.		9	55		I. *Tr. In.
	11	18		II. *Sh. In.	16	16	16		I. Oc. Dis.		11	7		I. *Sh. In.
	12	15		II. *Tr. Eg.		19	39	33.0	J. Ec. Re.		11	28		IV. *Oc. Dis.
	14	14		II. *Sh. Eg.	17	0	57		II. Tr. In.		12	15		I. *Tr. Eg.
	22	51		I. Tr. In.		3	12		II. Sh. In.		13	26		I. *Sh. Eg.
	23	51		I. Sh. In.		3	53		II. Tr. Eg.		16	13		IV. Oc. Re.
7	1	11		I. Tr. Eg.		6	8		II. Sh. Eg.		23	7	28.3	IV. Ec. Dis.
	1	58		III. Oc. Dis.		13	36		I. *Tr. In.	27	3	26	45.5	IV. Ec. Re.
	2	10		I. Sh. Eg.		14	43		I. Sh. In.		7	2		I. Oc. Dis.
	5	37		III. Oc. Re.		15	56		I. Tr. Eg.		10	31	58.7	I. *Ec. Re.
	6	5	24.1	III. Ec. Dis.		17	3		I. Sh. Eg.		16	40		II. Tr. In.
	9	32	27.7	III. *Ec. Re.		19	24		III. Tr. In.		19	6		II. Sh. In.
	19	59		I. Oc. Dis.		23	3		III. Tr. Eg.		19	36		II. Tr. Eg.
	23	16	3.4	I. Ec. Re.		23	58		III. Sh. In.		22	2		II. Sh. Eg.
8	4	26		II. Oc. Dis.	18	1	43		IV. Tr. In.	28	4	23		I. Tr. In.
	9	20	56.7	II. *Ec. Re.		3	34		III. Sh. Eg.		5	36		I. Sh. In.
	17	18		I. Tr. In.		6	27		IV. Tr. Eg.		6	43		I. Tr. Eg.
	18	20		I. Sh. In.		10	43		I. *Oc. Dis.		7	55		I. *Sh. Eg.
	19	38		I. Tr. Eg.		12	26		IV. *Sh. In.		13	2		III. *Oc. Dis.
	20	39		I. Sh. Eg.		14	8	19.7	I. *Ec. Re.		16	42		III. Oc. Re.
9	14	26		I. *Oc. Dis.		17	0		IV. Sh. Eg.		18	4	10.3	III. Ec. Dis.
	17	44	42.5	I. Ec. Re.		20	5		II. Oc. Dis.		21	29	46.7	III. Ec. Re.
	19	6		IV. Oc. Dis.	19	1	15	14.2	II. Ec. Re.	29	1	30		I. Oc. Dis.
	22	31		II. Tr. In.		8	3		I. *Tr. In.		5	0	45.2	I. Ec. Re.
	23	48		IV. Oc. Re.		9	12		I. *Sh. In.		11	49		II. *Oc. Dis.
10	0	36		II. Sh. In.		10	23		I. *Tr. Eg.		17	8	51.2	II. Ec. Re.
	1	27		II. Tr. Eg.		11	31		I. *Sh. Eg.		22	51		I. Tr. In.
	3	32		II. Sh. Eg.	20	5	11		I. Oc. Dis.	30	0	5		I. Sh. In.
	5	5	0.4	IV. Ec. Dis.		8	37	1.4	I. *Ec. Re.		1	11		I. Tr. Eg.
	9	28	12.0	IV. *Ec. Re.		14	11		II. Tr. In.		2	23		I. Sh. Eg.
	11	45		I. *Tr. In.		16	30		II. Sh. In.		19	59		I. Oc. Dis.
	12	49		I. *Sh. In.		17	7		II. Tr. Eg.		23	29	27.3	I. Ec. Re.
	14	5		I. *Tr. Eg.		19	26		II. Sh. Eg.					

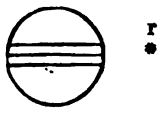
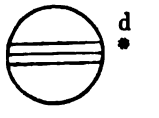
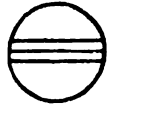
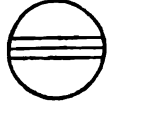
NOTE.—In, denotes ingress; Eg., egress; Dia., disappearance; Re., reappearance; Ec., eclipse.  
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.



WASHINGTON MEAN TIME.

APRIL.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.		III.	
II.		IV.	

*Configurations at 11<sup>h</sup> 0<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1	○ 4.				○ 1. 2		3	
2			4.	1	○ 2.		3.	
3	○ 1.		4.	2.	○ 3.			
4		4.		3.	○ 2.		1	
5		4.		3.	○ 1.		2.	
6	○ 2.	4.		3.	○ 1.			
7		4.		2.	○ 3.			
8			4.		○ 2 1.		3.	
9				1.	○ 2.		3.	
10			2.	1	○ 3.		4.	
11			3.	2	○ 4.		1.	●
12		3.		1.	○ 2.		4.	
13			3.		○ 2.		1.	4.
14			2.	1.	○ 3.		4.	
15					○ 2.	1.	3.	4.
16				1.	○ 2.		3.	4.
17				2.	○ 1.	3.	4.	
18			3.	2.	○ 4.		1.	●
19			3.	4.	○ 1.		2.	
20		4.		3.	○ 2.	1.		
21		4.		2.	○ 1.		3.	●
22		4.			○ 1.		3.	2.
23		4.		1.	○ 2.		3.	
24		4.		2.	○ 1.		3.	
25			4.	2.	○ 3.		1.	
26	○ 1.		3.		○ 4.		2.	
27			3.		○ 1.	2.	4.	
28			2.	1.	○ 3.		4.	
29				2.	○ 1.		3.	4.
30				1.	○ 2.		3.	4.

WASHINGTON MEAN TIME.														
MAY.														
d	h	m	s		d	h	m	s		d	h	m	s	
1	5	56		II. Tr. In.	12	0	19		II. Sh. In.	22	4	55		IV. Sh. Eg.
	8	24		II.* Sh. In.		0	42		II. Sh. Eg.		5	14	41.9	I. Ec. Re.
	8	52		II.* Tr. Eg.		3	14		II. Sh. Eg.		13	42		II. Tr. In.
	11	20		II.* Sh. Eg.		8	10		I.* Tr. In.		16	14		II. Sh. In.
	17	19		I. Tr. In.		9	26		I.* Sh. In.		16	38		II. Tr. Eg.
	18	34		I. Sh. In.		10	30		I.* Tr. Eg.		19	9		II. Sh. Eg.
	19	39		I. Tr. Eg.		11	45		I.* Sh. Eg.		23	2		I. Tr. In.
	20	52		I. Sh. Eg.		20	47		III. Oc. Dis.	23	0	18		I. Sh. In.
2	2	55		III. Tr. In.	13	0	26		III. Oc. Re.	23	0	18		I. Sh. In.
	6	35		III. Tr. Eg.		2	2	44.9	III. Ec. Dis.		1	22		I. Tr. Eg.
	7	57		III.* Sh. In.		4	49		III. Ec. Dis.		2	38		I. Sh. Eg.
	11	32		III.* Sh. Eg.		5	17		IV. Oc. Dis.		14	45		III. Tr. In.
	14	27		I. Oc. Dis.		5	27	18.9	I. Oc. Dis.		18	24		III. Tr. Eg.
	17	58	16.2	I. Ec. Re.		8	50	52.0	III. Ec. Re.		19	55		III. Sh. In.
3	1	5		II. Oc. Dis.		9	34		I.* Ec. Re.		20	10		I. Oc. Dis.
	6	26	51.7	II. Ec. Re.		16	55		IV.* Oc. Re.		23	29		III. Sh. Eg.
	11	47		I.* Tr. In.		17	10	43.9	II. Oc. Dis.		23	43	32.6	I. Ec. Re.
	13	2		I.* Sh. In.		21	25	49.5	IV. Ec. Dis.	24	8	49		II.* Oc. Dis.
	14	7		I. Tr. Eg.		22	20	7.6	IV. Ec. Re.		14	13	14.4	II. Ec. Re.
	15	21		I. Sh. Eg.	14	2	38		II. Tr. In.		17	30		I. Tr. In.
4	8	55		I.* Oc. Dis.		3	54		I. Sh. In.		18	46		I. Sh. In.
	12	26	59.8	I.* Ec. Re.		4	58		I. Tr. Eg.		19	50		I. Tr. Eg.
	18	34		IV. Tr. In.		6	13		I. Sh. Eg.		21	6		I. Sh. Eg.
	19	12		II. Tr. In.		23	46		I. Oc. Dis.	25	14	39		I. Oc. Dis.
	21	43		II. Sh. In.	15	3	19	35.1	I. Ec. Re.		18	12	17.4	I. Ec. Re.
	22	8		II. Tr. Eg.		11	4		II.* Tr. In.	26	3	2		II. Tr. In.
	23	19		IV. Tr. Eg.		13	37		II. Sh. In.		5	32		II. Sh. In.
5	0	38		II. Sh. Eg.		14	0		II. Tr. Eg.		5	58		II. Tr. Eg.
	6	16		I. Tr. In.		16	32		II. Sh. Eg.		8	27		II.* Sh. Eg.
	6	28		IV. Sh. In.		21	7		I. Tr. In.		11	59		I. Tr. In.
	7	31		I. Sh. In.		22	23		I. Sh. In.		13	14		I. Sh. In.
	8	36		I.* Tr. Eg.		23	27		I. Sh. In.		14	19		I. Tr. Eg.
	9	50		I.* Sh. Eg.	16	0	42		I. Tr. Eg.		15	35		I. Sh. Eg.
	10	58		IV.* Sh. Eg.		10	44		I. Sh. Eg.	27	4	48		III. Oc. Dis.
	16	52		III. Oc. Dis.		14	24		III.* Tr. In.		8	28		III.* Oc. Re.
	20	32		III. Oc. Re.		15	56		III. Tr. Eg.		9	8		I.* Oc. Dis.
	22	3	32.4	III. Ec. Dis.		18	15		III. Sh. In.		10	1	57.1	III.* Ec. Dis.
6	1	28	37.8	III. Ec. Re.		19	30		I. Oc. Dis.		12	41	6.7	I. Ec. Re.
	3	23		I. Oc. Dis.		21	48	25.1	III. Sh. Eg.		13	25	25.1	III. Ec. Re.
	6	55	47.4	I. Ec. Re.	17	6	13		I. Ec. Re.		22	8		III. Oc. Dis.
	14	21		II. Oc. Dis.		11	37	55.8	II. Oc. Dis.	28	3	30	47.6	II. Ec. Re.
	19	44	33.9	II. Ec. Re.		15	36		II.* Ec. Re.		6	28		I. Tr. In.
7	0	44		I. Tr. In.		16	52		I. Tr. In.		7	43		I. Sh. In.
	2	0		I. Sh. In.		17	56		I. Sh. In.		8	48		I.* Tr. Eg.
	3	4		I. Tr. Eg.		19	11		I. Tr. Eg.		10	4		I.* Sh. Eg.
	4	19		I. Sh. Eg.		18	12	43	I. Sh. Eg.		3	37		I. Oc. Dis.
	21	52		I. Oc. Dis.		16	17	9.6	I. Oc. Dis.	29	7	9	50.3	I. Ec. Re.
8	1	24	30.1	I. Ec. Re.	19	0	23		I. Ec. Re.		16	22		II. Tr. In.
	8	29		II.* Tr. In.		2	56		II. Tr. In.		18	50		II. Sh. In.
	11	1		II.* Sh. In.		3	19		II. Sh. In.		19	18		II. Tr. Eg.
	11	25		II.* Tr. Eg.		5	51		II. Tr. Eg.		21	45		II. Sh. Eg.
	13	56		II. Sh. Eg.		10	4		II. Sh. Eg.		23	2		IV. Oc. Dis.
	19	13		I. Tr. In.		11	20		I.* Tr. In.	30	0	57		I. Tr. In.
	20	28		I. Sh. In.		12	24		I.* Sh. In.		2	12		I. Sh. In.
	21	33		I. Tr. Eg.		13	40		I. Tr. Eg.		3	17		I. Tr. Eg.
	22	47		I. Sh. Eg.	20	0	45		I. Sh. Eg.		3	46		IV. Oc. Re.
9	6	47		III. Tr. In.		4	25		III. Oc. Dis.		4	32		I. Sh. Eg.
	10	27		III.* Tr. Eg.		6	2	4.6	III. Oc. Re.		11	13	32.8	IV.* Ec. Dis.
	11	56		III.* Sh. In.		7	12		III. Ec. Dis.		15	24	5.6	IV. Ec. Re.
	15	31		III. Sh. Eg.		9	26	6.2	I. Oc. Dis.		18	49		III. Tr. In.
	16	20		I. Oc. Dis.		10	45	58.5	III.* Ec. Re.		22	7		I. Oc. Dis.
	19	53	19.5	I. Ec. Re.		19	31		I.* Ec. Re.		22	28		III. Tr. Eg.
10	3	38		II. Oc. Dis.	21	0	55	32.3	II. Oc. Dis.		23	55		III. Sh. In.
	9	2	28.2	II.* Ec. Re.		4	33		II. Ec. Re.	31	1	38	41.2	I. Ec. Re.
	13	41		I. Tr. In.		5	49		I. Tr. In.		11	27		III. Sh. Eg.
	14	57		I. Sh. In.		6	53		I. Sh. In.		13	28		II.* Oc. Dis.
	16	1		I. Tr. Eg.		8	9		I. Tr. Eg.		16	48	23.5	II. Ec. Re.
	17	16		I. Sh. Eg.		12	19		I.* Sh. Eg.		19	26		I. Tr. In.
11	10	49		I.* Oc. Dis.		17	4		IV. Tr. In.		20	41		I. Sh. In.
	14	22	3.6	I. Ec. Re.	22	0	29		IV. Tr. Eg.		21	46		I. Tr. Eg.
	21	46		II. Tr. In.		1	41		IV. Sh. In.		23	1		I. Sh. Eg.
									I. Oc. Dis.					

## WASHINGTON MEAN TIME.

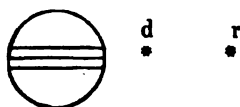
MAY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



III.



II.



IV.

*Configurations at 10<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1			2	○	1	3		4
2			2	1 3	○			4
3		3		○	1	2	4	
4		3		○	4	2		1 ●
5			2	4 1	○			
6		4		2	○	1	3	
7		4		1	○	2	3	
8	○ 2	4			○	1	3	
9		4		2	1	3	○	
10		4	3		○	1	2	
11		4	3		1	○	2	
12			2	1 3	1	○		
13			2		○	4	1	3
14			1		○	2	4	3
15					○	2	1	3
16			2	1	3	○		4
17			3		○	2	1	
18		3		1	○	2		4
19	○ 1		3	2	○			4
20			2		○	1	3	4
21			1		○	4	2	3
22			4		○	2	1	3
23		4	2	1	○	3		
24		4		3	○	1		2 ●
25		4	3		1	○	2	
26		4		3	2	○	1	
27		4		2		○	3	1 ●
28			4		1	○	2	3
29				4	○	1 3		3
30			2	1	○	4 3		
31			3	2	○	1		4

## WASHINGTON MEAN TIME.

## JUNE.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	16	36		I. Oc. Dia.	11	10	22		I. *Tr. In.	21	10	58		III. Tr. Eg.					
	20	7	26.2	I. Ec. Re.		11	33		I. Sh. In.		11	52		III. Sh. In.					
2	5	42		II. Tr. In.		12	42		I. Tr. Eg.		15	23		III. Sh. Eg.					
	8	9		II. *Sh. In.		13	52		I. Sh. Eg.		19	30		II. Oc. Dis.					
	8	38		II. *Tr. Eg.	19	7	32		I. Oc. Dis.	22	0	32	55.9	II. Ec. Re.					
	11	4		II. *Sh. Eg.		11	0	7.9	I. *Ec. Re.		1	19		I. Tr. In.					
	13	55		I. Tr. In.		21	45		II. Tr. In.		2	25		I. Sh. In.					
	15	10		I. Sh. In.	13	0	4		II. Sh. In.		3	39		I. Tr. Eg.					
	16	15		I. Tr. Eg.		0	41		II. Tr. Eg.		4	44		I. Sh. Eg.					
	17	30		I. Sh. Eg.		2	59		II. Sh. Eg.		22	30		I. Oc. Dis.					
3	8	54		III. *Oc. Dis.		4	51		I. Tr. In.	23	1	52	50.1	I. Ec. Re.					
	11	5		I. *Oc. Dis.		6	2		I. Sh. In.		13	51		II. Tr. In.					
	12	34		III. Oc. Re.		7	11		I. Tr. Eg.		16	0		II. Sh. In.					
	14	1	37.5	III. Ec. Dis.		8	21		I. *Sh. Eg.		16	47		II. Tr. Eg.					
	14	36	15.8	I. Ec. Re.	14	2	2		I. Oc. Dis.		18	55		II. Sh. Eg.					
	17	24	30.9	III. Ec. Re.		3	6		III. Tr. In.		19	49		I. Tr. In.					
4	0	47		II. Oc. Dis.		5	28	58.7	I. Ec. Re.		20	54		I. Sh. In.					
	6	5	53.1	II. Ec. Re.		6	45		III. Tr. Eg.		22	9		I. Tr. Eg.					
	8	25		I. *Tr. In.		7	53		III. Sh. In.		23	13		I. Sh. Eg.					
	9	39		I. *Sh. In.		11	24		III. Sh. Eg.	24	2	6		IV. Tr. In.					
	10	45		I. *Tr. Eg.		16	48		II. Oc. Dis.		6	49		IV. Tr. Eg.					
	11	58		I. Sh. Eg.		21	58	14.4	II. Ec. Re.		12	32		IV. Sh. In.					
5	5	34		I. Oc. Dis.		23	21		I. Tr. In.		16	49		IV. Sh. Eg.					
	9	4	59.2	I. *Ec. Re.	15	0	31		I. Sh. In.		17	0		I. Oc. Dis.					
	19	3		II. Tr. In.		1	41		I. Tr. Eg.		20	21	39.5	I. Ec. Re.					
	21	27		II. Sh. In.		2	50		I. Sh. Eg.		21	31		III. Oc. Dis.					
	21	59		II. Tr. Eg.		17	58		IV. Oc. Dis.	25	1	10		III. Oc. Re.					
6	0	22		II. Sh. Eg.		20	31		I. Oc. Dis.		2	0	41.7	III. Ec. Dis.					
	2	54		I. Tr. In.		22	42		IV. Oc. Re.		5	21	45.7	III. Ec. Re.					
	4	7		I. Sh. In.		23	57	43.0	I. Ec. Re.		8	51		II. *Oc. Dis.					
	5	14		I. Tr. Eg.	16	5	16	11.6	IV. Ec. Dis.		13	50	13.9	II. Ec. Re.					
	6	26		I. Sh. Eg.		9	21	51.6	IV. *Ec. Re.		14	19		I. Tr. In.					
	22	56		III. Tr. In.		11	7		II. Tr. In.		15	23		I. Sh. In.					
7	0	4		I. Oc. Dis.		13	23		II. Sh. In.		16	39		I. Tr. Eg.					
	2	35		III. Tr. Eg.		14	3		II. Tr. Eg.		17	42		I. Sh. Eg.					
	3	33	50.1	I. Ec. Re.		16	18		II. Sh. Eg.	26	11	30		I. Oc. Dis.					
	3	54		III. Sh. In.		17	50		I. Tr. In.		14	50	21.6	I. Ec. Re.					
	6	53		IV. Tr. In.		18	59		I. Sh. In.	27	3	14		II. Tr. In.					
	7	26		III. Sh. Eg.		20	10		I. Tr. Eg.		5	19		II. Sh. In.					
	11	37		IV. Tr. Eg.		21	18		I. Sh. Eg.		6	10		II. Tr. Eg.					
	14	7		II. Oc. Dis.	17	15	1		I. Oc. Dis.		8	13		II. *Sh. Eg.					
	18	31		IV. Sh. In.		17	16		III. Oc. Dis.		8	48		I. *Tr. In.					
	19	23	23.6	II. Ec. Re.		18	26	32.6	I. Ec. Re.		9	51		I. *Sh. In.					
	21	23		I. Tr. In.		20	55		III. Oc. Re.		11	8		I. Tr. Eg.					
	22	36		I. Sh. In.		22	1	18.4	III. Ec. Dis.		12	10		I. Sh. Eg.					
	22	52		IV. Sh. Eg.	18	1	22	59.4	III. Ec. Re.	28	6	0		I. Oc. Dis.					
	23	43		I. Tr. Eg.		6	9		II. Oc. Dis.		9	19	11.4	I. *Ec. Re.					
8	0	55		I. Sh. Eg.		11	15	36.6	II. Ec. Re.		11	36		III. Tr. In.					
	18	33		I. Oc. Dis.		12	20		I. Tr. In.		15	14		III. Tr. Eg.					
	22	2	34.9	I. Ec. Re.		13	28		I. Sh. In.		15	51		III. Sh. In.					
9	8	24		II. *Tr. In.		14	40		I. Tr. Eg.		19	22		III. Sh. Eg.					
	10	46		II. *Sh. In.		15	47		I. Sh. Eg.		22	13		II. Oc. Dis.					
	11	20		II. Tr. Eg.		19	9	31	I. *Oc. Dis.	29	3	7	28.8	II. Ec. Re.					
	13	41		II. Sh. Eg.		12	55	15.3	I. Ec. Re.		3	18		I. Tr. In.					
	15	53		I. Tr. In.	20	0	29		II. Tr. In.		4	20		I. Sh. In.					
	17	5		I. Sh. In.		2	41		II. Sh. In.		5	38		I. Tr. Eg.					
	18	13		I. Tr. Eg.		3	25		II. Tr. Eg.		6	39		I. Sh. Eg.					
	19	24		I. Sh. Eg.		5	36		II. Sh. Eg.	30	0	30		I. Oc. Dis.					
10	13	3		I. Oc. Dis.		6	50		I. Tr. In.		3	47	55.3	I. Ec. Re.					
	13	4		III. Oc. Dis.		7	57		I. Sh. In.		16	37		II. Tr. In.					
	16	31	24.6	I. Ec. Re.		9	10		I. *Tr. Eg.		18	38		II. Sh. In.					
	16	43		III. Oc. Re.		10	16		I. *Sh. Eg.		19	33		II. Tr. Eg.					
	18	1	47.4	III. Ec. Dis.	21	4	0		I. Oc. Dis.		21	32		II. Sh. Eg.					
	21	24	5.2	III. Ec. Re.		7	20		III. Tr. In.		21	48		I. Tr. In.					
11	3	27		II. Oc. Dis.		7	24	5.8	I. Ec. Re.		22	49		I. Sh. In.					
	8	40	49.5	II. *Ec. Re.															

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

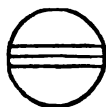
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

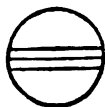
JUNE.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.

r  
•

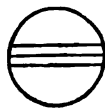
III.

d  
•r  
•

II.

r  
•

IV.

d  
•r  
•*Configurations at 9<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1		3 <sup>•</sup>	1 <sup>•</sup>	○	2 <sup>•</sup>	4 <sup>•</sup>		
2		3 <sup>•</sup>	2 <sup>•</sup>	○	1 <sup>•</sup>	4 <sup>•</sup>		
3		2 <sup>•</sup>	1 <sup>•</sup>	○		4 <sup>•</sup>	3 <sup>•</sup>	●
4	○ 1 <sup>•</sup>			○	2 <sup>•</sup>	3 <sup>•</sup>	4 <sup>•</sup>	
5				○	1 <sup>•</sup>	2 <sup>•</sup>	3 <sup>•</sup>	4 <sup>•</sup>
6		2 <sup>•</sup>	1 <sup>•</sup>	○	3 <sup>•</sup>	4 <sup>•</sup>		
7	○ 4 <sup>•</sup>		3 <sup>•</sup> 2 <sup>•</sup>	○	1 <sup>•</sup>			
8		3 <sup>•</sup>	4 <sup>•</sup> 1 <sup>•</sup>	○	2 <sup>•</sup>			
9	○ 2 <sup>•</sup>	4 <sup>•</sup>	3 <sup>•</sup>	○	1 <sup>•</sup>			
10		4 <sup>•</sup>	2 <sup>•</sup> 1 <sup>•</sup> 3 <sup>•</sup>	○				
11		4 <sup>•</sup>		○ 1 <sup>•</sup>	2 <sup>•</sup>	3 <sup>•</sup>		
12		4 <sup>•</sup>		○	2 <sup>•</sup>	3 <sup>•</sup>	1 <sup>•</sup>	●
13		4 <sup>•</sup>	2 <sup>•</sup> 1 <sup>•</sup>	○	3 <sup>•</sup>			
14		4 <sup>•</sup>	2 <sup>•</sup> 3 <sup>•</sup>	○	1 <sup>•</sup>			
15		3 <sup>•</sup>	1 <sup>•</sup> 4 <sup>•</sup>	○	2 <sup>•</sup>			
16		3 <sup>•</sup>		○ 2 <sup>•</sup>	1 <sup>•</sup>			
17		2 <sup>•</sup>	1 <sup>•</sup>	○		4 <sup>•</sup>		
18				○ 2 <sup>•</sup> 1 <sup>•</sup>	3 <sup>•</sup>	4 <sup>•</sup>		
19				○ 1 <sup>•</sup>	2 <sup>•</sup>	3 <sup>•</sup>	4 <sup>•</sup>	
20			2 <sup>•</sup> 1 <sup>•</sup>	○	3 <sup>•</sup>	4 <sup>•</sup>		
21	○ 3 <sup>•</sup>		2 <sup>•</sup>	○	1 <sup>•</sup>	4 <sup>•</sup>		
22		3 <sup>•</sup>	1 <sup>•</sup>	○	2 <sup>•</sup>	4 <sup>•</sup>		
23		3 <sup>•</sup>		○	2 <sup>•</sup> 1 <sup>•</sup> 4 <sup>•</sup>			
24			2 <sup>•</sup> 3 <sup>•</sup> 1 <sup>•</sup>	4 <sup>•</sup> ○				
25		4 <sup>•</sup>		○	1 <sup>•</sup> 3 <sup>•</sup>		2 <sup>•</sup>	●
26		4 <sup>•</sup>	1 <sup>•</sup>	○	2 <sup>•</sup>	3 <sup>•</sup>		
27	○ 1 <sup>•</sup>	4 <sup>•</sup>	2 <sup>•</sup>	○	3 <sup>•</sup>			
28		4 <sup>•</sup>	2 <sup>•</sup>	○ 3 <sup>•</sup>				
29		4 <sup>•</sup>	3 <sup>•</sup> 1 <sup>•</sup>	○	2 <sup>•</sup>			
30		4 <sup>•</sup> 3 <sup>•</sup>		○	1 <sup>•</sup> 2 <sup>•</sup>			

## WASHINGTON MEAN TIME.

## JULY.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	0	8		I. Tr. Eg.	11	8	46		II. * Tr. In.	21	6	30		I. Oc. Dis.					
1	1	8		I. Sh. Eg.		10	33		II. Sh. In.		9	32	54.0	I. Ec. Re.					
19	0			I. Oc. Dis.		10	45		IV. Sh. Eg.	22	1	0		II. Tr. In.					
22	16	44.2		I. Ec. Re.		11	43		II. Tr. Eg.		2	29		II. Sh. In.					
2	1	48		III. Oc. Dis.		12	47		I. Tr. In.		3	47		I. Tr. In.					
	5	27		III. Oc. Re.		13	28		II. Sh. Eg.		3	55		II. Tr. Eg.					
	5	59	53.3	III. Ec. Dis.		13	40		I. Sh. In.		4	32		I. Sh. In.					
	9	20	19.1	III. * Ec. Re.		15	7		I. Tr. Eg.		5	23		II. Sh. Eg.					
	11	35		II. Oc. Dis.		15	59		I. Sh. Eg.		6	6		I. Tr. Eg.					
	13	31		IV. Oc. Dis.	12	9	59		I. Oc. Dis.		6	51		I. Sh. Eg.					
	16	17		I. Tr. In.		13	9	15.2	I. Ec. Re.	23	1	0		I. Oc. Dis.					
	16	24	43.1	II. Ec. Re.		20	14		III. Tr. In.		4	1	40.6	I. Ec. Re.					
	17	17		I. Sh. In.		23	50		III. Sh. In.		14	52		III. Oc. Dis.					
	18	12		IV. Oc. Re.		23	51		III. Tr. Eg.		19	50		II. Oc. Dis.					
	18	37		I. Tr. Eg.	13	3	19		III. Sh. Eg.		21	16	45.7	III. Ec. Re.					
	19	37		I. Sh. Eg.		3	41		II. Oc. Dis.		22	17		I. Tr. In.					
	23	19	14.4	IV. Ec. Dis.		7	17		I. Tr. In.		23	0		I. Sh. In.					
3	3	19	43.4	IV. Ec. Re.		8	9		I. * Sh. In.	24	0	7	21.5	II. Ec. Re.					
	13	29		I. Oc. Dis.		8	16	9.7	II. * Ec. Re.		0	36		I. Tr. Eg.					
	16	45	25.7	I. Ec. Re.		9	37		I. Tr. Eg.		1	19		I. Sh. Eg.					
4	6	0		II. Tr. In.		10	28		I. Sh. Eg.		19	31		I. Oc. Dis.					
	7	56		II. Sh. In.	14	4	30		I. Oc. Dis.		22	30	19.6	I. Ec. Re.					
	8	56		II. * Tr. Eg.		7	37	57.7	I. Ec. Re.	25	14	24		II. Tr. In.					
	10	47		I. Tr. In.		22	10		II. Tr. In.		15	47		II. Sh. In.					
	10	50		II. Sh. Eg.		23	52		II. Sh. In.		16	47		I. Tr. In.					
	11	46		I. Sh. In.	15	1	7		II. Tr. Eg.		17	20		II. Tr. Eg.					
	13	7		I. Tr. Eg.		1	47		I. Tr. In.		17	29		I. Sh. In.					
	14	5		I. Sh. Eg.		2	37		I. Sh. In.		18	41		II. Sh. Eg.					
5	7	59		I. Oc. Dis.		2	46		II. Sh. Eg.		19	6		I. Tr. Eg.					
	11	14	14.7	I. Ec. Re.		4	7		I. Tr. Eg.		19	48		I. Sh. Eg.					
	15	54		III. Tr. In.		4	56		I. Sh. Eg.	26	14	1		I. Oc. Dis.					
	19	32		III. Tr. Eg.		23	0		I. Oc. Dis.		16	59	6.1	I. Ec. Re.					
	19	52		III. Sh. In.	16	2	6	45.1	I. Ec. Re.	27	4	59		III. Tr. In.					
	23	21		III. Sh. Eg.		10	29		III. Oc. Dis.		7	47		III. Sh. In.					
6	0	57		II. Oc. Dis.		17	4		II. Oc. Dis.		8	34		III. Tr. Eg.					
	5	17		I. Tr. In.		17	17	59.0	III. Ec. Re.		9	13		II. Oc. Dis.					
	5	41	53.5	II. Ec. Re.		20	17		I. Tr. In.		11	15		III. Sh. Eg.					
	6	15		I. Sh. In.		21	6		I. Sh. In.		11	17		I. Tr. In.					
	7	37		I. Tr. Eg.		21	33	16.2	II. Ec. Re.		11	58		I. Sh. In.					
	8	34		I. * Sh. Eg.		22	36		I. Tr. Eg.		13	24	21.3	II. Ec. Re.					
7	2	29		I. Oc. Dis.		23	25		I. Sh. Eg.		13	36		I. Tr. Eg.					
	5	42	58.0	I. Ec. Re.	17	17	30		I. Oc. Dis.		14	17		I. Sh. Eg.					
	19	23		II. Tr. In.		20	35	25.0	I. Ec. Re.		18	1		IV. Tr. In.					
	21	15		II. Sh. In.	18	11	35		II. Tr. In.		22	35		IV. Tr. Eg.					
	22	20		II. Tr. Eg.		13	10		II. Sh. In.		20	35		IV. Sh. In.					
	23	47		I. Tr. In.		14	31		II. Tr. Eg.		4	42		IV. Sh. Eg.					
8	0	9		II. Sh. Eg.		14	47		I. Tr. In.		8	31		I. Oc. Dis.					
	0	43		I. Sh. In.		15	34		I. Sh. In.		11	27	46.6	I. Ec. Re.					
	2	7		I. Tr. Eg.		16	4		II. Sh. Eg.	29	3	49		II. Tr. In.					
	3	2		I. Sh. Eg.		17	6		I. Tr. Eg.		5	6		II. Sh. In.					
	20	59		I. Oc. Dis.		17	53		I. Sh. Eg.		5	47		I. Tr. In.					
9	0	11	46.0	I. Ec. Re.	19	9	31		IV. Oc. Dis.		6	26		I. Sh. In.					
	6	8		III. Oc. Dis.		12	0		I. Oc. Dis.		6	44		II. Tr. Eg.					
	9	45		III. Oc. Re.		14	8		IV. Oc. Re.		8	0		II. Sh. Eg.					
	9	59	8.4	III. Ec. Dis.		15	4	12.5	I. Ec. Re.		8	6		I. Tr. Eg.					
	13	18	54.8	III. Ec. Re.		17	21	31.9	IV. Ec. Dis.		8	45		I. Sh. Eg.					
	14	19		II. Oc. Dis.		21	16	28.3	IV. Ec. Re.	30	3	1		I. Oc. Dis.					
	18	17		I. Tr. In.	20	0	36		III. Tr. In.		5	56	32.4	I. Ec. Re.					
	18	59	3.6	II. Ec. Re.		3	49		III. Sh. In.		19	17		III. Oc. Dis.					
	19	12		I. Sh. In.		4	12		III. Tr. Eg.		22	36		II. Oc. Dis.					
	20	37		I. Tr. Eg.		6	27		II. Oc. Dis.	31	0	17		I. Tr. In.					
	21	31		I. Sh. Eg.		7	17		III. Sh. Eg.		0	55		I. Sh. In.					
10	15	29		I. Oc. Dis.		9	17		I. Tr. In.		1	15	56.0	III. Ec. Re.					
	18	40	23.6	I. Ec. Re.		10	3		I. Sh. In.		2	36		I. Tr. Eg.					
	21	51		IV. Tr. In.		10	50	19.0	II. Ec. Re.		2	41	19.7	II. Ec. Re.					
11	2	30		IV. Tr. Eg.		11	36		I. Tr. Eg.		3	14		I. Sh. Eg.					
	6	33		IV. Sh. In.		12	22		I. Sh. Eg.		21	32		I. Oc. Dis.					

The satellites are not visible during August and September, Jupiter being too near the sun.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

JULY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



III.



II.



IV.

*Configurations at 8<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.	East.
1	·4 ·3 ·1	○
2		○ ·3 ·1
3	·1	○ ·4 ·2 ·3
4	○ ·2	○ ·1 ·3 ·4
5	·2	○ ·3 ·4 ·1 ●
6	·3 ·1	○ ·2 ·4
7	·3	○ ·1 ·2 ·4
8	·3 ·2 ·1	○ ·4
9	·2	○ ·1 ·4 ·3 ●
10	·1	○ ·4 ·2 ·3
11	·4 ·2	○ ·1 ·3
12	·4 ·2 ·1	○ ·3
13	○ ·1 ·4 ·3	○ ·2
14	·4 ·3	○ ·1 ·2
15	·4 ·3 ·2 ·1	○
16	·4 ·3	○ ·1
17	·4 ·1	○ ·2 ·3
18	·4	○ ·2 ·1 ·3
19	·2 ·1	○ ·4 ·3
20	·3	○ ·1 ·4 ·2 ●
21	·3	○ ·2 ·4 ·1 ●
22	·3 ·2 ·1	○ ·4
23	·2 ·3	○ ·1 ·4
24	·1	○ ·2 ·3 ·4
25		○ ·2 ·1 ·3 ·4
26	·2 ·1	○ ·3 ·4
27	○ ·3	○ ·2 ·1 ·4
28	·3 ·4	○ ·1 ·2
29	·4 ·2 ·1	○
30	·4 ·2 ·3	○ ·1
31	·4 ·1	○ ·3

## WASHINGTON MEAN TIME.

## OCTOBER.

d	h	m	s		d	h	m	s		d	h	m	s	
1	1	50		I. Sh. Eg.	11	14	54		I. Tr. In.	21	10	47		III. Sh. Eg.
	2	12		I. Tr. Eg.		16	27		IV. Oc. Dis.		11	2		I. Oc. Re.
	4	36		II. Sh. In.		16	40		I. * Sh. Eg.		13	32		III. Tr. Eg.
	5	20		II. Tr. In.		17	12		I. * Tr. Eg.	22	5	12		I. Sh. In.
	7	28		II. Sh. Eg.		20	9		IV. Oc. Re.		5	54		I. Tr. In.
	8	13		II. Tr. Eg.		20	29		II. Sh. In.		7	30		I. Sh. Eg.
	20	52	29.8	I. Ec. Dis.		21	34		II. Tr. In.		8	12		I. Tr. Eg.
	23	32		I. Oc. Re.		23	22		II. Sh. Eg.		12	22		II. Sh. In.
2	18	0		I. Sh. In.	12	0	27		II. Tr. Eg.		13	46		II. Sh. In.
	18	24		I. Tr. In.		11	43	25.9	I. Ec. Dis.		15	15		II. Sh. Eg.
	20	18		I. Sh. Eg.		14	32		I. Oc. Re.		16	38		II. * Tr. Eg.
	20	42		I. Tr. Eg.	13	8	50		I. Sh. In.	23	2	34	10.1	I. Ec. Dis.
	22	57	28.5	II. Ec. Dis.		9	24		I. Tr. In.		5	32		I. Oc. Re.
3	0	36		IV. Sh. In.		11	8		I. Sh. Eg.		23	40		I. Sh. In.
	2	36		II. Oc. Re.		11	42		I. Tr. Eg.	24	0	24		I. Tr. In.
	4	18		IV. Sh. Eg.		14	47	56.4	II. Ec. Dis.		1	58		I. Sh. Eg.
	4	24		IV. Tr. In.		18	45		II. Oc. Re.		2	42		I. Tr. Eg.
	8	15		IV. Tr. Eg.	14	3	30		III. Sh. In.		6	38	32.1	II. Ec. Dis.
	9	47	57.0	III. Ec. Dis.		5	51		III. Tr. In.		10	54		II. Oc. Re.
	14	45		III. Oc. Re.		6	11	51.6	I. Ec. Dis.		21	2	32.5	I. Ec. Dis.
	15	20	56.4	I. Ec. Dis.		6	50		III. Sh. Eg.		21	42	38.8	III. Ec. Dis.
	18	2		I. Oc. Re.		9	2		I. Oc. Re.	25	0	2		I. Oc. Re.
4	12	28		I. Sh. In.		9	10		III. Tr. Eg.		3	53		III. Oc. Re.
	12	54		I. Tr. In.	15	3	18		I. Sh. In.		18	8		I. Sh. In.
	14	46		I. Sh. Eg.		3	54		I. Tr. In.		18	54		I. Tr. In.
	15	12		I. Tr. Eg.		5	36		I. Sh. Eg.		20	26		I. Sh. Eg.
	17	53		II. Sh. In.		6	12		I. Tr. Eg.		21	12		I. Tr. Eg.
	18	45		II. Tr. In.		9	47		II. Sh. In.	26	1	40		II. Sh. In.
	20	46		II. Sh. Eg.		10	58		II. Tr. In.		3	10		II. Tr. In.
	21	37		II. Tr. Eg.		12	40		II. Sh. Eg.		4	32		II. Sh. Eg.
5	9	49	29.2	I. Ec. Dis.		13	51		II. Tr. Eg.		6	2		II. Tr. Eg.
	12	32		I. Oc. Re.	16	0	40	23.0	I. Ec. Dis.		15	31	0.1	I. Ec. Dis.
6	6	57		I. Sh. In.		3	32		I. Oc. Re.		18	32		I. Oc. Re.
	7	24		I. Tr. In.		21	47		I. Sh. In.	27	12	37		I. Sh. In.
	9	15		I. Sh. Eg.		22	24		I. Tr. In.		13	24		I. Tr. In.
	9	42		I. Tr. Eg.	17	0	5		I. Sh. Eg.		14	55		I. Sh. Eg.
	12	14	17.3	II. Ec. Dis.		0	42		I. Tr. Eg.		15	41		I. Tr. Eg.
	15	59		II. Oc. Re.		4	4	48.4	II. Ec. Dis.		19	55	21.3	II. Ec. Dis.
	23	31		III. Sh. In.		8	9		II. Oc. Re.	28	0	17		II. Oc. Re.
7	1	25		III. Tr. In.		17	44	5.7	III. * Ec. Dis.		5	28	30.7	IV. Ec. Dis.
	2	52		III. Sh. Eg.		19	8	46.8	I. Ec. Dis.		8	42	5.7	IV. Ec. Re.
	4	17	56.7	I. Ec. Dis.		22	2		I. Oc. Re.		9	59	22.9	I. Ec. Dis.
	4	46		III. Tr. Eg.		23	31		III. Oc. Re.		11	26		III. Sh. In.
	7	2		I. Oc. Re.	18	16	15		I. Sh. In.		12	51		IV. Oc. Dis.
8	1	25		I. Sh. In.		16	54		I. * Tr. In.		13	2		I. Oc. Re.
	1	54		I. Tr. In.		18	33		I. Sh. Eg.		14	37		III. Tr. In.
	3	43		I. Sh. Eg.		19	12		I. Tr. Eg.		14	44		III. Sh. Eg.
	4	12		I. Tr. Eg.		23	4		II. Sh. In.		16	13		IV. * Oc. Re.
	7	11		II. Sh. In.	19	0	22		II. Tr. In.		17	52		III. * Tr. Eg.
	8	9		II. Tr. In.		1	57		II. Sh. Eg.	29	7	5		I. Sh. In.
	10	4		II. Sh. Eg.		3	15		II. Tr. Eg.		7	54		I. Tr. In.
	11	2		II. Tr. Eg.		13	37	16.0	I. Ec. Dis.		9	23		I. Sh. Eg.
	22	46	29.7	I. Ec. Dis.		16	32		I. * Oc. Re.		10	11		I. Tr. Eg.
9	1	32		I. Oc. Re.		18	35		IV. Sh. In.		14	58		II. Sh. In.
	19	53		I. Sh. In.		22	10		IV. Sh. Eg.		16	33		II. * Tr. In.
	20	24		I. Tr. In.		0	54		IV. Tr. In.		17	50		II. * Sh. Eg.
	22	11		I. Sh. Eg.	20	4	26		IV. Tr. Eg.		19	25		II. Tr. Eg.
	22	42		I. Tr. Eg.		10	43		I. Sh. In.	30	4	27	51.0	I. Ec. Dis.
10	1	31	7.8	II. Ec. Dis.		11	24		I. Tr. In.		7	32		I. Oc. Re.
	5	22		II. Oc. Re.		13	1		I. Sh. Eg.	31	1	33		I. Sh. In.
	13	46	1.0	III. Ec. Dis.		13	42		I. Tr. Eg.		2	24		I. Tr. In.
	17	14	55.0	I. * Ec. Dis.		17	21	37.3	II. * Ec. Dis.		3	51		I. Sh. Eg.
	19	9		III. Oc. Re.		21	32		II. Oc. Re.		4	40		I. Tr. Eg.
	20	2		I. Oc. Re.	21	7	28		III. Sh. In.		9	12	19.2	II. Ec. Dis.
11	11	28	23.9	IV. Ec. Dis.		8	5	40.4	I. Ec. Dis.		13	39		II. Oc. Re.
	14	22		I. Sh. In.		10	15		III. Tr. In.		22	56	11.8	I. Ec. Dis.
	14	49	59.7	IV. Ec. Re.										

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.



## WASHINGTON MEAN TIME.

OCTOBER.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



III.



II.



IV.

*Configurations at 17<sup>h</sup> 0<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1		3.	2.	1.	○	4.		
2			3.	2.	○	1.	4.	
3				4.	○	3.	2.	1. ●
4			4.		○	2.	3.	
5		4.		2.	○	1.	3.	
6		4.		1.	○	2.	3.	
7		4.		3.	○	1.	2.	
8		4.	3.	1.	○			
9		4.	3.	2.	○	1.		
10			4.	1.	○	2.		3. ●
11	○ 1.				○	2.	3.	4. ●
12			2.		○	1.	4.	3.
13				1.	○	3.	4.	2. ●
14				3.	○	1.	2.	4.
15			3.	1.	○	2.		4.
16			3.	2.	○	1.		4.
17				1.	○	2.		4.
18				1.	○	2.	3.	4.
19			2.		○	1.	4.	3.
20				4.	○	1.	2.	3.
21			4.		○	3.		1.
22			4.	3.	○	1.	2.	
23			4.	3.	○	2.		1.
24			4.		○	3.	1.	2.
25			4.		○	1.	2.	3.
26			4.	2.	○		3.	1. ●
27				4.	○	2.	1.	3.
28	○ 3.				○	4.	1.	2.
29	○ 2.			3.	○		1.	4.
30			3.	2.	○		1.	4.
31				3.	○	1.	2.	4.

## WASHINGTON MEAN TIME.

## NOVEMBER.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	1	40	49.0	III. Ec. Dis.	11	5	45		II. Oc. Re.	21	10	34		I. Tr. Eg.					
2	1			I. Oc. Re.		13	46	29.5	I. Ec. Dis.		16	54	9.0	II. * Ec. Dis.					
4	48	15.6		III. Ec. Re.		16	59		I. * Oc. Re.		21	50		II. Oc. Re.					
4	59			III. Oc. Dis.		19	21		III. Sh. In.	22	4	36	34.9	I. Ec. Dis.					
8	13			III. Oc. Re.		22	37		III. Sh. Eg.		6	33		IV. Sh. In.					
20	2			I. Sh. In.		23	17		III. Tr. In.		7	55		I. Oc. Re.					
20	53			I. Tr. In.	12	2	27		III. Tr. Eg.		9	53		IV. Sh. Eg.					
22	20			I. Sh. Eg.		10	52		I. Sh. In.		13	34	44.0	III. Ec. Dis.					
23	10			I. Tr. Eg.		11	50		I. Tr. In.		16	39	29.2	III. * Ec. Re.					
2	4	15		II. Sh. In.		13	10		I. Sh. Eg.		16	59		IV. * Tr. In.					
5	56			II. Tr. In.		14	7		I. Tr. Eg.		17	54		III. * Oc. Dis.					
7	7			II. Sh. Eg.		20	8		II. Sh. In.		19	39		IV. Tr. Eg.					
8	48			II. Tr. Eg.		22	4		II. Tr. In.		21	0		III. Oc. Re.					
17	24	37.8		I. * Ec. Dis.		22	59		II. Sh. Eg.	23	1	42		I. Sh. In.					
20	31			I. Oc. Re.	13	0	55		II. Tr. Eg.		2	47		I. Tr. In.					
3	14	30		I. Sh. In.		8	14	54.7	I. Ec. Dis.		4	0		I. Sh. Eg.					
15	23			I. Tr. In.		11	29		I. Oc. Re.		5	4		I. Tr. Eg.					
16	48			I. * Sh. Eg.		23	28	23.1	IV. Ec. Dis.		11	59		II. Sh. In.					
17	39			I. * Tr. Eg.	14	2	33	29.1	IV. Ec. Re.		14	10		II. Tr. In.					
22	29	8.6		II. Ec. Dis.		5	20		I. Sh. In.		14	50		II. * Sh. Eg.					
4	3	2		II. Oc. Re.		6	19		I. Tr. In.		16	59		II. * Tr. Eg.					
11	52	59.1		I. Ec. Dis.		7	38		I. Sh. Eg.		23	4	55.9	I. Ec. Dis.					
15	0			I. Oc. Re.		8	36		I. Tr. Eg.	24	2	25		I. Oc. Re.					
15	23			III. Sh. In.		8	56		IV. Oc. Dis.		20	11		I. Sh. In.					
18	41			III. Sh. Eg.		11	52		IV. Oc. Re.		21	17		I. Tr. In.					
18	58			III. Tr. In.		14	20	6.8	II. Ec. Dis.		22	28		I. Sh. Eg.					
22	11			III. Tr. Eg.		19	7		II. Oc. Re.		23	33		I. Tr. Eg.					
5	8	58		I. Sh. In.	15	2	43	12.9	I. Ec. Dis.	25	6	11	1.4	II. Ec. Dis.					
9	52			I. Tr. In.		5	58		I. Oc. Re.		11	11		II. Oc. Re.					
11	16			I. Sh. Eg.		9	37	7.8	III. Ec. Dis.		17	33	13.4	I. * Ec. Dis.					
12	9			I. Tr. Eg.		12	42	47.8	III. Ec. Re.		20	54		I. Oc. Re.					
12	35			IV. Sh. In.		13	39		III. Oc. Dis.	26	3	16		III. Sh. In.					
16	2			IV. * Sh. Eg.		16	47		III. * Oc. Re.		6	31		III. Sh. Eg.					
17	33			II. * Sh. In.		23	49		I. Sh. In.		7	48		III. Tr. In.					
19	19			II. Tr. In.	16	0	49		I. Tr. In.		10	53		III. Tr. Eg.					
20	24			II. Sh. Eg.		2	7		I. Sh. Eg.		14	38		I. * Sh. In.					
21	9			IV. Tr. In.		3	6		I. Tr. Eg.		15	46		I. * Tr. In.					
22	10			II. Tr. Eg.		9	25		II. Sh. In.		16	56		I. * Sh. Eg.					
6	0	18		IV. Tr. Eg.		11	26		II. Tr. In.		18	2		I. * Tr. Eg.					
6	21	25.9		I. Ec. Dis.		12	16		II. Sh. Eg.	27	1	16		II. Sh. In.					
9	30			I. Oc. Re.		14	17		II. Tr. Eg.		3	31		II. Tr. In.					
7	3	27		I. Sh. In.	17	0	27	35.4	I. Ec. Dis.		4	8		II. Sh. Eg.					
4	22			I. Tr. In.		17	0	27	I. Oc. Re.		6	20		II. Tr. Eg.					
5	45			I. Sh. Eg.		18	17		I. * Sh. In.		12	1	35.8	I. Ec. Dis.					
6	38			I. Tr. Eg.		19	18		I. Tr. In.		15	23		I. * Oc. Re.					
11	46	10.5		II. Ec. Dis.		20	35		I. Sh. Eg.	28	9	7		I. Sh. In.					
16	24			II. * Oc. Re.		21	35		I. Tr. Eg.		10	15		I. Tr. In.					
8	0	49	45.4	I. Ec. Dis.	18	3	36	57.9	II. Ec. Dis.		11	24		I. Sh. Eg.					
4	0			I. Oc. Re.		8	29		II. Oc. Re.		12	31		I. Tr. Eg.					
5	39	19.9		III. Ec. Dis.		15	39	54.0	I. * Ec. Dis.		19	28	17.7	II. Ec. Dis.					
8	45	53.7		III. Ec. Re.		18	57		I. Oc. Re.	29	0	31		II. Oc. Re.					
9	20			III. Oc. Dis.		23	19		III. Sh. In.		6	29	52.1	I. Ec. Dis.					
12	32			III. Oc. Re.	19	2	34		III. Sh. Eg.		9	52		I. Oc. Re.					
21	55			I. Sh. In.		3	34		III. Tr. In.		17	32	10.6	III. * Ec. Dis.					
22	51			I. Tr. In.		6	42		III. Tr. Eg.		20	36	0.8	III. Ec. Re.					
9	0	13		I. Sh. Eg.		12	45		I. Sh. In.		22	7		III. Oc. Dis.					
1	8			I. Tr. Eg.		13	48		I. Tr. In.	30	1	10		III. Oc. Re.					
6	50			II. Sh. In.		15	4		I. * Sh. Eg.		3	35		I. Sh. In.					
8	42			II. Tr. In.		16	5		I. * Tr. Eg.		4	44		I. Tr. In.					
9	41			II. Sh. Eg.		22	42		II. Sh. In.		5	52		I. Sh. Eg.					
11	33			II. Tr. Eg.	20	0	48		II. Tr. In.		7	0		I. Tr. Eg.					
19	18	9.6		I. Ec. Dis.		1	33		II. Sh. Eg.		14	33		II. * Sh. In.					
22	30			I. Oc. Re.		3	38		II. Tr. Eg.		16	52		II. * Tr. In.					
10	16	24		I. * Sh. In.		10	8	17.7	I. Ec. Dis.		17	25		II. * Sh. Eg.					
17	20			I. * Tr. In.		13	26		I. Oc. Re.		17	28	41.6	IV. * Ec. Dis.					
18	41			I. Sh. Eg.	21	7	14		I. Sh. In.		19	40		II. Tr. Eg.					
19	37			I. Tr. Eg.		8	17		I. Tr. In.		20	24	43.4	IV. Ec. Re.					
11	1	3	0.6	II. Ec. Dis.		9	32		I. Sh. Eg.										

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

NOVEMBER.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.

d

\*



III.

d

\*

r

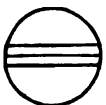
\*



II.

d

\*



IV.

d

\*

r

\*

*Configurations at 16<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1				○	1· 3 2·		·4	
2			2·	·1 ○		·3		4·
3	○ 1·		·2	○		3·		4·
4				○ 1·	·2		4·	
5			3·	1· ○	·2·			
6			·3	2· 4·	○	·1		
7			4·	·3 ·1	○ 2·			
8			4·		○ ·3 1·	2·		
9		4·		2· ·1	○	·3		
10		·4		·2	○ 1·		3·	
11		·4			○ 3·	·2		·1 ●
12		·4		3· 1·	○ 2·			
13			3·	2· 4·	○	·1		
14			·3	1·	○ ·4			·2 ●
15					○ 1· 2·	·4		·3 ●
16				·1 2·	○	·3	·4	
17			·2		○ 1·	3·	·4	
18				·1	○ 1· 2·		4·	
19			3·	1·	○ 2·		4·	
20			3·	2·	○	·1	4·	
21			·3	1·	·2 ○		4·	
22				·3	○ 4·	·1	·2	
23			4·	·1	2· ○		·3	
24		4·		·2	○	1·	3·	
25		4·		·1	○	·2	3·	
26	○ 1·	4·		3·	○	2·		
27		·4		3· 2·	○	·1		
28		·4		·3	○			
29			·4		·3 ○	·1	·2	
30	○ 2·			1· ·4	○	·3		

## WASHINGTON MEAN TIME.

## DECEMBER.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	0	58	11.9	I. Ec. Dis.	10	21	54		I. Tr. Eg.	21	10	29		I. Tr. In.					
	4	21		I. Oc. Re.	11	6	24		II. Sh. In.		11	32		I. Sh. Eg.					
	4	34		IV. Oc. Dis.		8	51		II. Tr. In.		12	45		I. Tr. Eg.					
	6	57		IV. Oc. Re.		9	16		II. Sh. Eg.		13	21		III. * Oc. Re.					
	22	3		I. Sh. In.		11	39		II. Tr. Eg.		22	15		II. Sh. In.					
	23	13		I. Tr. In.		15	47	59.2	I. * Ec. Dis.	22	0	46		II. Tr. In.					
2	0	20		I. Sh. Eg.		19	14		I. Oc. Re.		1	6		II. Sh. Eg.					
	1	29		I. Tr. Eg.	12	12	53		I. Sh. In.		3	32		II. Tr. Eg.					
	8	45	11.4	II. Ec. Dis.		14	7		I. * Tr. In.		6	37	35.3	I. Ec. Dis.					
	13	51		II. Oc. Re.		15	10		I. * Sh. Eg.		10	5		I. Oc. Re.					
	19	26	28.5	I. Ec. Dis.		16	23		I. * Tr. Eg.	23	3	43		I. Sh. In.					
	22	50		I. Oc. Re.	13	0	36	56.8	II. Ec. Dis.		4	57		I. Tr. In.					
3	7	14		III. Sh. In.		5	50		II. Oc. Re.		6	0		I. Sh. Eg.					
	10	29		III. Sh. Eg.		10	16	13.6	I. Ec. Dis.		7	14		I. Tr. Eg.					
	12	0		III. Tr. In.		13	43		I. * Oc. Re.		16	23	27.7	II. * Ec. Dis.					
	15	2		III. * Tr. Eg.	14	1	27	43.3	III. Ec. Dis.		21	44		II. Oc. Re.					
	16	32		I. * Sh. In.		4	29	41.9	III. Ec. Re.	24	1	5	49.2	I. Ec. Dis.					
	17	42		I. * Tr. In.		6	23		III. Oc. Dis.		4	33		I. Oc. Re.					
	18	49		I. Sh. Eg.		7	22		I. Sh. In.		19	7		III. Sh. In.					
	19	58		I. Tr. Eg.		8	35		I. Tr. In.		22	12		I. Sh. In.					
4	3	50		II. Sh. In.		9	21		III. Oc. Re.		22	18		III. Sh. Eg.					
	6	12		II. Tr. In.		9	39		I. Sh. Eg.		23	26		I. Tr. In.					
	6	42		II. Sh. Eg.		10	51		I. Tr. Eg.	25	0	13		III. Tr. In.					
	9	0		II. Tr. Eg.		19	41		II. Sh. In.		0	29		I. Sh. Eg.					
	13	54	49.8	I. * Ec. Dis.		22	10		II. Tr. In.		1	42		I. Tr. Eg.					
	17	19		I. * Oc. Re.		22	32		II. Sh. Eg.		3	7		III. Tr. Eg.					
5	11	0		I. Sh. In.	15	0	57		II. Tr. Eg.		11	32		II. Sh. In.					
	12	11		I. Tr. In.		4	44	30.9	I. Ec. Dis.		14	3		II. * Tr. In.					
	13	17		I. Sh. Eg.		8	11		I. Oc. Re.		14	23		II. * Sh. Eg.					
	14	27		I. * Tr. Eg.	16	1	50		I. Sh. In.		16	49		II. * Tr. Eg.					
	22	2	33.3	II. Ec. Dis.		3	4		I. Tr. In.		18	31		IV. * Sh. In.					
6	3	11		II. Oc. Re.		4	7		I. Sh. Eg.		19	34	7.6	I. Ec. Dis.					
	8	23	5.0	I. Ec. Dis.		5	20		I. Tr. Eg.		21	34		IV. Sh. Eg.					
	11	48		I. Oc. Re.		13	53	54.0	II. * Ec. Dis.		23	2		I. Oc. Re.					
	21	29	41.0	III. Ec. Dis.		19	8		II. Oc. Re.	26	6	59		IV. Tr. In.					
7	0	32	35.6	III. Ec. Re.		23	12	45.5	I. Ec. Dis.		8	12		IV. Tr. Eg.					
	2	16		III. Oc. Dis.	17	2	40		I. Oc. Re.		16	40		I. * Sh. In.					
	5	17		III. Oc. Re.		11	28	21.5	IV. Ec. Dis.		17	54		I. * Tr. In.					
	5	28		I. Sh. In.		14	14	43.9	IV. * Ec. Re.		18	57		I. Sh. Eg.					
	6	40		I. Tr. In.		15	9		III. * Sh. In.		20	11		I. Tr. Eg.					
	7	45		I. Sh. Eg.		18	22		III. * Sh. Eg.	27	5	46	8.6	II. Ec. Dis.					
	8	56		I. Tr. Eg.		20	13		III. Tr. In.		11	2		II. Oc. Re.					
	17	7		II. * Sh. In.		20	18		I. Sh. In.		14	2	21.3	I. * Ec. Dis.					
	19	32		II. Tr. In.		21	32		I. Tr. In.		17	30		I. * Oc. Re.					
	19	59		II. Sh. Eg.		22	35		I. Sh. Eg.	28	9	23	29.1	III. Ec. Dis.					
	22	20		II. Tr. Eg.		23	9		III. Tr. Eg.		11	8		I. Sh. In.					
8	2	51	23.7	I. Ec. Dis.		23	30		IV. Oc. Dis.		12	23		I. Tr. In.					
	6	17		I. Oc. Re.		23	48		I. Tr. Eg.		12	23	33.5	III. Ec. Re.					
	23	57		I. Sh. In.	18	1	17		IV. Oc. Re.		13	25		I. * Sh. Eg.					
9	0	32		IV. Sh. In.		8	58		II. Sh. In.		14	25		III. * Oc. Dis.					
	1	9		I. Tr. In.		11	28		II. Tr. In.		14	39		I. * Tr. Eg.					
	2	14		I. Sh. Eg.		11	49		II. Sh. Eg.		17	18		III. * Oc. Re.					
	3	25		I. Tr. Eg.		14	15		II. * Tr. Eg.	29	0	49		II. Sh. In.					
	3	43		IV. Sh. Eg.		17	41	4.6	I. * Ec. Dis.		3	21		II. Tr. In.					
	11	19	28.7	II. Ec. Dis.		21	8		I. Oc. Re.		3	40		II. Sh. Eg.					
	12	17		IV. Tr. In.	19	14	47		I. * Sh. In.		6	7		II. Tr. Eg.					
	14	22		IV. * Tr. Eg.		16	1		I. * Tr. In.		8	30	37.2	I. Ec. Dis.					
	16	31		II. * Oc. Re.		17	4		I. * Sh. Eg.		11	58		I. Oc. Re.					
	21	19	39.2	I. Ec. Dis.		18	17		I. * Tr. Eg.	30	5	37		I. Sh. In.					
10	0	45		I. Oc. Re.	20	3	11	28.3	II. Ec. Dis.		6	51		I. Tr. In.					
	11	12		III. Sh. In.		8	26		II. Oc. Re.		7	54		I. Sh. Eg.					
	14	25		III. * Sh. Eg.		12	9	18.5	I. Ec. Dis.		9	8		I. Tr. Eg.					
	16	8		III. * Tr. In.		15	37		I. * Oc. Re.		19	3	10.7	II. Ec. Dis.					
	18	25		I. * Sh. In.		5	25	24.5	III. Ec. Dis.	31	0	18		II. Oc. Re.					
	19	8		III. Tr. Eg.		8	26	26.3	III. Ec. Re.		2	58	50.8	I. Ec. Dis.					
	19	38		I. Tr. In.		9	15		I. Sh. In.		6	26		I. Oc. Re.					
	20	42		I. Sh. Eg.		10	26		III. Oc. Dis.		23	4		III. Sh. In.					

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

WASHINGTON MEAN TIME.

DECEMBER.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.

d  
\*



III.

d  
\*

r  
\*



II.

d  
\*



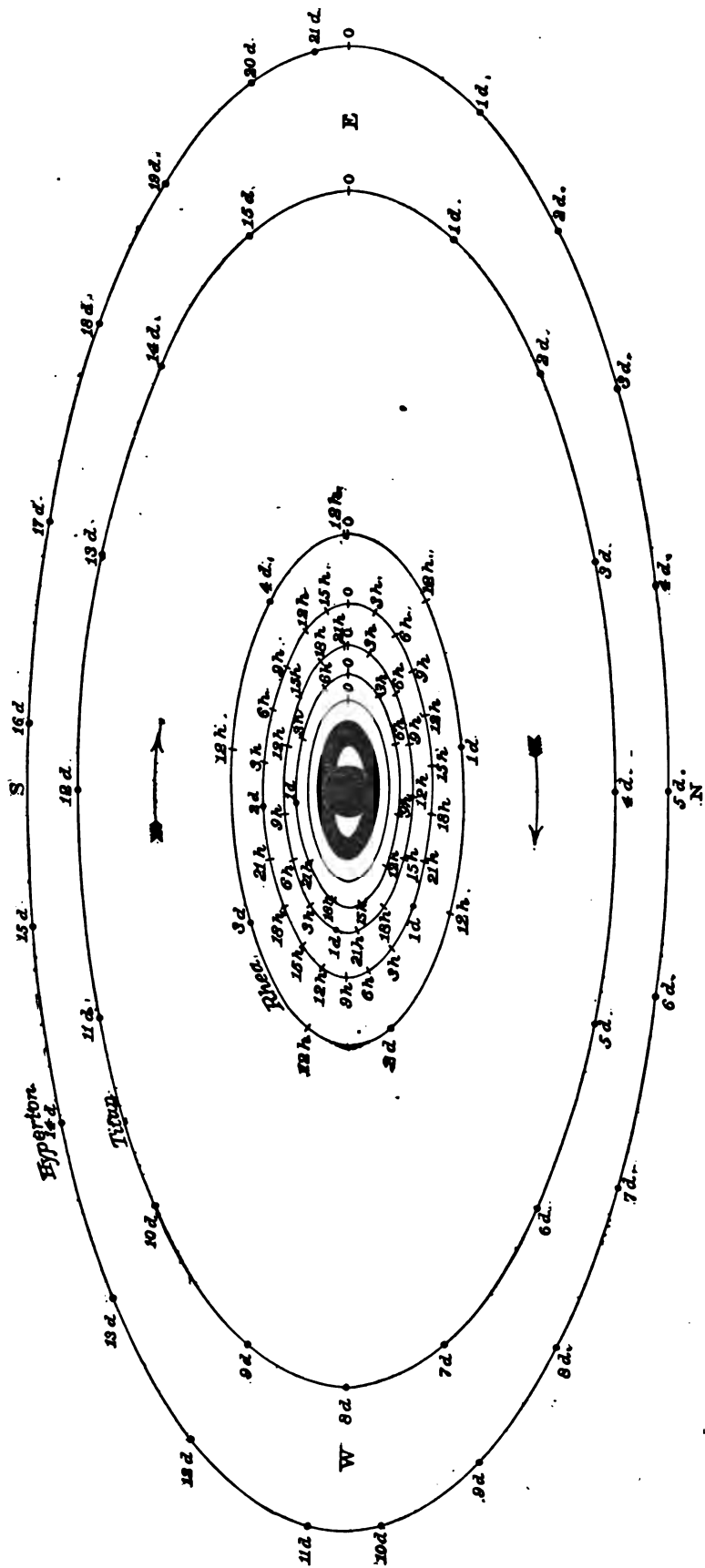
IV.

d  
\*  
r  
\*



*Configurations at 16<sup>h</sup> 0<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1			2	○	4	1	3	
2			1	○	2	3	4	
3			3	○	1	2		4
4		3	2	○			4	1 ●
5		3	2	1 ○			4	
6			3	○	1	2		4
7			1	○	2	3		4
8			2	○	1	4	3	
9			1	4 ○		3		2 ●
10			4	3 ○	1	2		
11		4	3	2 1 ○				
12	○ 1	4	3	2	○			
13		4		3	○	1	2	
14		4		1	○	3		
15		4	2	○	1	3		
16			4	1 ○		3		2 ●
17				4 ○	3	1	2	
18			3	1 2 ○		4		
19			3	2 1 ○			4	
20			3	○	1	2		4
21				1 ○	3	2		4
22			2	○	1	3		4
23				1 2 ○		3	4	
24				○	1	2	4	
25			3	2 1 ○		4		
26			3	2 4 ○	1			
27				4 3 ○	2			1 ●
28		4		1 ○		2		3 ●
29		4		2 ○	1	3		
30		4		1 2 ○			3	
31		4		○	1	3	2	



#### NAMES OF THE SATELLITES.

- I. Mimas.
- II. Enceladus.
- III. Tethys.
- IV. Dione.
- V. Rhea.
- VI. Titan.
- VII. Hyperion.
- VIII. Japetus.

#### MEAN SYNODIC PERIODS.

	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.8
VIII.	79	22.0

APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN IN 1884 AND 1885,  
AS SEEN IN AN INVERTING TELESCOPE.

WASHINGTON MEAN TIMES OF ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked "o" are those of the eastern elongation, as seen in an inverting telescope. The apparent positions of a satellite at any time may be marked on the diagram by counting around the orbit the interval in days and hours which has elapsed since the last east elongation. The times of these elongations may be found from the following tables. Mimas can be seen only within a few hours of each elongation: the time of every elongation visible at Washington is therefore given. The times of other elongations of any satellite in the same direction may be found by adding or subtracting any multiple of the period. For the three outer satellites the times of elongation and conjunction are given. The following abbreviations are used:—

E., East Elongation,  
I., Inferior Conjunction (north of planet),  
W., West Elongation,  
S., Superior Conjunction (south of planet).

MIMAS.

*Elongations Visible at Washington.*

Jan. 1 8.0 W.	Feb. 3 7.4 W.	Mar. 14 10.0 E.	Oct. 1 17.0 W.	Nov. 6 12.2 W.	Dec. 9 11.9 W.
2 6.6 W.	4 6.0 W.	15 8.6 E.	2 15.6 W.	7 10.9 W.	10 10.5 W.
3 5.2 W.	5 4.6 W.	16 7.2 E.	3 14.2 W.	13 13.7 E.	11 9.1 W.
7 10.9 E.	9 10.3 E.	17 5.8 E.	4 12.8 W.	14 12.3 E.	12 7.7 W.
8 9.5 E.	10 8.9 E.	23 9.0 W.	9 17.0 E.	15 10.9 E.	13 6.3 W.
9 8.1 E.	11 7.5 E.	24 7.6 W.	10 15.6 E.	16 9.5 E.	14 4.9 W.
10 6.7 E.	12 6.2 E.	25 6.2 W.	11 14.2 E.	21 14.1 W.	16 13.3 E.
11 5.3 E.	18 9.3 W.	26 4.8 W.	12 12.8 E.	22 12.7 W.	17 11.9 E.
15 11.2 W.	19 7.9 W.	31 9.1 E.	17 17.3 W.	23 11.3 W.	18 10.5 E.
16 9.8 W.	20 6.5 W.	Apr. 1 7.7 E.	18 15.9 W.	24 9.9 W.	19 9.1 E.
17 8.4 W.	21 5.1 W.	2 6.3 E.	19 14.6 W.	25 8.6 W.	20 7.7 E.
18 7.0 W.	26 9.6 E.	8 9.5 W.	20 13.2 W.	26 7.2 W.	21 6.3 E.
19 5.6 W.	27 8.2 E.	9 8.1 W.	26 16.0 E.	30 12.9 E.	22 4.9 E.
24 9.9 E.	28 6.8 E.	10 6.7 W.	27 14.6 E.	Dec. 1 11.5 E.	25 12.2 W.
25 8.5 E.	Mar. 1 5.4 E.		28 13.2 E.	2 10.1 E.	26 10.8 W.
26 7.1 E.	6 9.9 W.	Sept. 23 16.3 E.	29 11.9 E.	3 8.7 E.	27 9.4 W.
27 5.7 E.	7 8.5 W.	24 14.9 E.	Nov. 3 16.4 W.	4 7.3 E.	28 8.0 W.
Feb. 1 10.2 W.	8 7.1 W.	25 13.5 E.	4 15.0 W.	5 5.9 E.	29 6.7 W.
2 8.8 W.	9 5.7 W.	26 12.1 E.	5 13.6 W.	8 13.3 W.	30 5.3 W.

ENCELADUS.

Jan. 3 16.3 E.	Jan. 17 9.0 E.	Jan. 31 1.9 E.	Feb. 13 18.7 E.	Feb. 27 11.6 E.	Mar. 13 4.4 E.
5 1.1 E.	18 17.9 E.	Feb. 1 10.8 E.	15 3.6 E.	28 20.4 E.	14 13.3 E.
6 10.0 E.	20 2.8 E.	2 19.7 E.	16 12.5 E.	Mar. 2 5.3 E.	15 22.2 E.
7 18.9 E.	21 11.6 E.	4 4.5 E.	17 21.3 E.	3 14.1 E.	17 7.0 E.
9 3.8 E.	22 20.5 E.	5 13.4 E.	19 6.2 E.	4 23.0 E.	18 15.9 E.
10 12.6 E.	24 5.4 E.	6 22.2 E.	20 15.1 E.	6 7.9 E.	20 0.8 E.
11 21.5 E.	25 14.3 E.	8 7.1 E.	22 0.0 E.	7 16.8 E.	21 9.7 E.
13 6.4 E.	26 23.2 E.	9 16.0 E.	23 8.9 E.	9 1.7 E.	22 18.6 E.
14 15.3 E.	28 8.1 E.	11 0.9 E.	24 17.8 E.	10 10.6 E.	24 3.6 E.
16 0.2 E.	29 17.0 E.	12 9.8 E.	26 2.7 E.	11 19.5 E.	25 12.5 E.

## WASHINGTON MEAN TIMES OF EAST ELONGATIONS.

## ENCELADUS—(Concluded.)

Mar. 26 21.4 E.	Sept. 26 13.9 E.	Oct. 17 3.3 E.	Nov. 6 16.5 E.	Nov. 27 5.7 E.	Dec. 17 18.8 E.
28 6.3 E.	27 22.8 E.	18 12.2 E.	8 1.3 E.	28 14.6 E.	19 3.7 E.
29 15.2 E.	29 7.7 E.	19 21.1 E.	9 10.2 E.	29 23.5 E.	20 12.6 E.
31 0.0 E.	30 16.6 E.	21 6.0 E.	10 19.1 E.	Dec. 1 8.4 E.	21 21.5 E.
Apr. 1 8.9 E.	Oct. 2 1.5 E.	22 14.8 E.	12 4.0 E.	2 17.2 E.	23 6.3 E.
2 17.8 E.	3 10.4 E.	23 23.7 E.	13 12.9 E.	4 2.1 E.	24 15.2 E.
4 2.7 E.	4 19.3 E.	25 8.6 E.	14 21.8 E.	5 11.0 E.	26 0.1 E.
5 11.6 E.	6 4.2 E.	26 17.5 E.	16 6.7 E.	6 19.9 E.	27 9.0 E.
6 20.5 E.	7 13.1 E.	28 2.4 E.	17 15.6 E.	8 4.8 E.	28 17.9 E.
8 5.4 E.	8 21.9 E.	29 11.3 E.	19 0.4 E.	9 13.6 E.	30 2.7 E.
9 14.3 E.	10 6.8 E.	30 20.2 E.	20 9.3 E.	10 22.5 E.	31 11.6 E.
10 23.2 E.	11 15.7 E.	Nov. 1 5.1 E.	21 18.2 E.	12 7.4 E.	1886
12 8.1 E.	13 0.6 E.	2 14.0 E.	23 3.1 E.	13 16.3 E.	Jan. 1 20.4 E.
13 16.9 E.	14 9.5 E.	3 22.8 E.	24 12.0 E.	15 1.1 E.	3 5.3 E.
15 1.8 E.	15 18.4 E.	5 7.6 E.	25 20.8 E.	16 9.9 E.	4 14.2 E.

## TETHYS.

Jan. 2 3.6 E.	Feb. 8 21.5 E.	Mar. 18 15.7 E.	Sept. 23 13.3 E.	Oct. 31 7.3 E.	Dec. 8 1.3 E.
4 0.9 E.	10 18.8 E.	20 13.0 E.	25 10.6 E.	Nov. 2 4.6 E.	9 22.6 E.
5 22.2 E.	12 16.1 E.	22 10.3 E.	27 7.9 E.	4 2.0 E.	11 19.9 E.
7 19.5 E.	14 13.4 E.	24 7.6 E.	29 5.2 E.	5 23.3 E.	13 17.2 E.
9 16.8 E.	16 10.7 E.	26 5.0 E.	Oct. 1 2.6 E.	7 20.7 E.	15 14.4 E.
11 14.1 E.	18 8.0 E.	28 2.3 E.	2 23.9 E.	9 18.0 E.	17 11.7 E.
13 11.4 E.	20 5.3 E.	29 23.6 E.	4 21.2 E.	11 15.3 E.	19 9.0 E.
15 8.7 E.	22 2.6 E.	31 20.9 E.	6 18.5 E.	13 12.6 E.	21 6.3 E.
17 5.9 E.	23 23.9 E.	Apr. 2 18.3 E.	8 15.8 E.	15 9.8 E.	23 3.5 E.
19 3.2 E.	25 21.2 E.	4 15.6 E.	10 13.1 E.	17 7.1 E.	25 0.8 E.
21 0.5 E.	27 18.5 E.	6 12.9 E.	12 10.4 E.	19 4.4 E.	26 22.1 E.
22 21.8 E.	Mar. 1 15.8 E.	8 10.2 E.	14 7.7 E.	21 1.7 E.	28 19.4 E.
24 19.1 E.	3 13.2 E.	10 7.6 E.	16 5.0 E.	22 23.0 E.	30 16.7 E.
26 16.4 E.	5 10.5 E.	12 4.9 E.	18 2.3 E.	24 20.3 E.	1886
28 13.7 E.	7 7.8 E.	14 2.2 E.	19 23.6 E.	26 17.6 E.	Jan. 1 14.0 E.
30 11.0 E.	9 5.1 E.	15 23.5 E.	21 20.9 E.	28 14.9 E.	3 11.3 E.
Feb. 1 8.2 E.	11 2.4 E.	17 20.9 E.	23 18.1 E.	30 12.1 E.	5 8.6 E.
3 5.5 E.	12 23.7 E.	19 18.2 E.	25 15.4 E.	Dec. 2 9.4 E.	
5 2.8 E.	14 21.0 E.		27 12.7 E.	4 6.7 E.	
7 0.1 E.	16 18.3 E.		29 10.0 E.	6 4.0 E.	

## DIONE.

Jan. 1 0.4 E.	Feb. 2 20.2 E.	Mar. 7 16.5 E.	Apr. 9 13.0 E.	Oct. 29 5.7 E.	Dec. 1 1.6 E.
3 18.1 E.	5 13.9 E.	10 10.2 E.		31 23.4 E.	3 19.3 E.
6 11.7 E.	8 7.5 E.	13 3.9 E.	Oct. 1 20.9 E.	Nov. 3 17.0 E.	6 12.9 E.
9 5.4 E.	11 1.2 E.	15 21.6 E.	4 14.6 E.	6 10.7 E.	9 6.6 E.
11 23.0 E.	13 18.9 E.	18 15.3 E.	7 8.3 E.	9 4.4 E.	12 0.2 E.
14 16.7 E.	16 12.6 E.	21 9.0 E.	10 2.0 E.	11 22.1 E.	14 17.9 E.
17 10.3 E.	19 6.2 E.	24 2.7 E.	12 19.7 E.	14 15.7 E.	17 11.5 E.
20 4.0 E.	21 23.9 E.	26 20.4 E.	15 13.4 E.	17 9.4 E.	20 5.2 E.
22 21.6 E.	24 17.7 E.	29 14.2 E.	18 7.1 E.	20 3.0 E.	22 22.9 E.
25 15.3 E.	27 11.4 E.	Apr. 1 7.9 E.	21 0.8 E.	22 20.7 E.	25 16.6 E.
28 8.8 E.	Mar. 2 5.1 E.	4 1.6 E.	23 18.4 E.	25 14.3 E.	28 10.1 E.
31 2.5 E.	4 22.8 E.	6 19.3 E.	26 12.1 E.	28 8.0 E.	31 3.8 E.



RHEA.				TITAN.				HYPERION.							
Jan.	d	h		Sep. 27	d	h		Jan.	d	h		Sep. 13	d	h	
	3	9.0 E.			27	4.3 E.			5	2.0 S.					
	7	21.4 E.			1	16.7 E.			10	9.2 E.			18	17.0 S.	
	12	9.8 E.			6	5.2 E.			15	16.5 I.			24	1.0 E.	
	16	22.1 E.			10	17.7 E.			20	23.8 W.			29	9.0 I.	
	21	10.4 E.			15	6.0 E.			26	7.0 S.		Oct. 4	17.0 W.		
	25	22.8 E.			19	18.5 E.			31	14.2 E.			10	1.0 S.	
	30	11.0 E.			24	6.9 E.			Feb. 5	21.5 I.			15	8.9 E.	
Feb.	3	23.5 E.			28	19.3 E.			11	4.7 W.			20	16.7 I.	
	8	11.9 E.		Nov. 2	7.7 E.		Feb. 4	18.6 E.	16	12.0 S.			26	0.4 W.	
	13	0.2 E.		6	20.1 E.		8	18.1 I.	21	19.5 E.			31	8.0 S.	
	17	12.6 E.		11	8.3 E.		12	17.6 W.	27	3.1 I.		Nov. 5	15.5 E.		
	22	1.1 E.		15	20.7 E.		16	17.2 S.	Mar. 4	10.9 W.			10	22.8 I.	
	26	13.5 E.		20	9.1 E.		20	16.8 E.	9	19.0 S.			16	6.0 W.	
Mar.	3	1.9 E.		24	21.4 E.		24	16.4 I.	15	3.2 E.			21	13.0 S.	
	7	14.4 E.		29	9.7 E.		28	16.1 W.	23	18.0 I.			26	20.0 E.	
	12	2.8 E.		Dec. 3	22.1 E.		Mar. 4	15.9 S.	27	17.4 W.			25	19.7 W.	
	16	15.3 E.		8	10.3 E.		8	15.8 E.	Dec. 1	16.7 S.			31	4.0 S.	
	21	3.9 E.		12	22.6 E.		12	15.7 I.	5	16.1 E.		Apr. 5	12.3 E.		
	25	16.3 E.		17	10.9 E.		16	15.6 W.	9	15.5 I.		10	20.5 I.		
	30	4.9 E.		21	23.1 E.		20	15.5 S.	13	14.9 W.		16	4.7 W.		
Apr.	3	17.4 E.		26	11.4 E.		24	15.5 E.	17	14.2 S.		21	13.0 S.		
	8	5.9 E.		30	23.8 E.		28	15.5 I.	21	13.4 E.		26	21.3 E.		
	12	18.3 E.	1886				Apr. 1	15.6 W.	25	12.6 I.		May 2	5.6 I.		
				Jan. 4	12.1 E.		5	15.6 S.	29	11.8 W.					

JAPETUS	Superior Conjunction .	January 6	March 26	June 17	September 6	November 24
	East Elongation .	January 25	April 16	July 6	September 26	December 12
	Inferior Conjunction .	February 13	May 7	July 27	October 16	December 31
	West Elongation .	March 5	May 28	August 16	November 4	

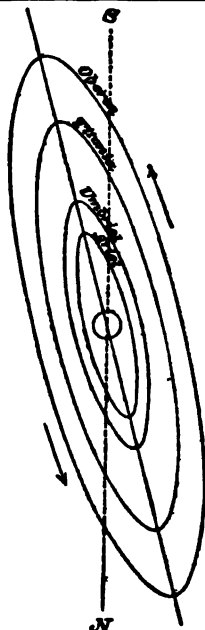
THE APPARENT ELEMENTS OF SATURN'S RINGS.

Greenwich Mean Noon.	Outer Major Axis.	Outer Minor Axis.	p Inclination of Northern Semi-Minor Axis to Circle of Declination from North to East.	l The Elevation of the Earth above the Plane of the Ring.	l' The Elevation of the Sun above the Plane of the Ring.	Earth's Longitude from Saturn counted on Plane of Ring from the Ring's Ascending Node on	
						Equator.	Ecliptic.
Jan. 0	46.25	20.81	— 5 14.8	— 26 43.4	— 26 49.2	134 3.1	91 23.4
20	45.27	20.40	5 6.6	26 47.1	26 49.5	132 39.2	89 59.5
Feb. 9	43.87	19.82	5 2.5	26 51.7	26 49.4	131 56.5	89 16.9
Mar. 1	42.30	19.16	5 3.3	26 56.4	26 48.8	132 2.7	89 23.2
21	40.78	18.52	5 9.0	27 0.7	26 48.0	132 58.5	90 19.1
Apr. 10	39.47	17.95	— 5 18.8	— 27 3.7	— 26 46.9	134 37.0	91 57.7
30	38.43	17.49	5 31.5	27 4.0	26 45.5	136 49.6	94 10.3
May 20	37.74	17.14	5 45.8	27 0.5	26 43.8	139 26.0	96 46.8
June 9	37.39	16.90	6 0.3	26 52.4	26 41.7	142 15.8	99 36.7
29	37.39	16.78	6 14.1	26 39.8	26 39.5	145 9.8	102 30.8
July 19	37.76	16.78	— 6 26.5	— 26 23.7	— 26 36.9	147 57.8	105 18.9
Aug. 8	38.46	16.92	6 36.8	26 5.7	26 34.0	150 31.0	107 52.2
28	39.50	17.19	6 44.8	25 47.9	26 30.9	152 40.1	110 1.3
Sept. 17	40.80	17.60	6 50.2	25 33.2	26 27.5	154 15.6	111 36.9
Oct. 7	42.32	18.15	6 53.1	25 24.2	26 23.7	155 10.0	112 31.4
27	43.88	18.81	— 6 53.5	— 25 22.9	— 26 19.7	155 17.3	112 34.8
Nov. 16	45.29	19.50	6 51.4	25 30.0	26 15.4	154 37.0	111 58.6
Dec. 6	46.48	20.09	6 46.9	25 43.4	26 10.8	153 16.3	110 37.9
26	46.65	20.45	6 40.7	26 0.3	26 6.0	151 31.8	108 53.5
31	46.61	20.49	— 6 39.0	— 26 4.6	— 26 4.6	151 4.6	108 26.4

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring	= 0.8801	log factor = 9.9445
The outer ellipse of the inner ring	= 0.8599	log factor = 9.9344
The inner ellipse of the inner ring	= 0.6650	log factor = 9.8228
The inner ellipse of the dusky ring	= 0.5486	log factor = 9.7392

NOTE.—The negative sign of *l* indicates that the visible surface of the ring is the southern one.

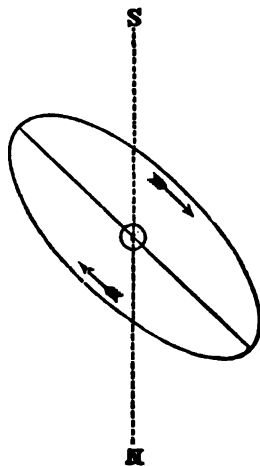


APPARENT ORBITS OF THE SATELLITES OF URANUS IN 1885,  
AS SEEN IN AN INVERTING TELESCOPE.

### WASHINGTON MEAN TIMES OF ELONGATIONS.

ARIEL.		UMBRIEL.		TITANIA.		OBERON.
North.	South.	North.	South.	North.	South.	North and South.
d h	d h	d h	d h	d h	d h	d h
Jan. 0 0.3	Jan. 1 6.5	Jan. 3 23.9	Jan. 6 1.6	Jan. 1 5.9	Jan. 5 14.4	Jan. 1 9.0 N.
7 13.8	8 20.0	12 6.8	14 8.6	9 22.9	14 7.3	8 2.6 S.
15 3.2	16 9.4	20 13.8	22 15.5	18 15.8	23 0.3	14 20.2 N.
22 16.7	23 22.9	28 20.7	30 22.4	27 8.8	31 17.2	21 13.8 S.
30 6.2	31 12.3	Feb. 6 3.6	Feb. 8 5.3	Feb. 5 1.7	Feb. 9 10.1	28 7.4 N.
Feb. 6 19.6	Feb. 8 1.8	14 10.6	16 12.2	13 18.6	18 3.0	Feb. 4 1.0 S.
14 9.1	15 15.3	22 17.5	24 19.2	22 11.5	26 19.9	10 18.5 N.
21 22.6	23 4.8	Mar. 3 0.4	Mar. 5 2.1	Mar. 3 4.4	Mar. 7 12.9	17 12.1 S.
Mar. 1 12.0	Mar. 2 18.2	11 7.3	13 9.0	11 21.4	16 5.8	24 5.6 N.
9 1.5	10 7.7	19 14.2	21 15.9	20 14.3	24 22.7	Mar. 2 23.2 S.
16 14.9	17 21.1	27 21.1	29 22.8	29 7.3	Apr. 2 15.7	9 16.8 N.
24 4.4	25 10.6	Apr. 5 4.0	Apr. 7 5.7	Apr. 7 0.2	11 8.7	16 10.3 S.
31 17.9	Apr. 2 0.1	13 10.9	15 12.6	15 17.2	20 1.6	23 3.8 N.
Apr. 8 7.3	9 13.5	21 17.8	23 19.5	24 10.2	28 18.6	29 21.4 S.
15 20.8	17 3.0	30 0.7	May 2 2.4	May 3 3.1	May 7 11.6	Apr. 5 15.0 N.
23 10.3	24 16.5	May 8 7.6	10 9.3	11 20.1	16 4.5	12 8.5 S.
30 23.8	May 2 6.0	16 14.5	18 16.2	20 13.0	24 21.4	19 2.1 N.
May 8 13.2	9 19.5	24 21.4	26 23.1	29 5.9	June 2 14.3	25 19.6 S.
16 2.7	17 8.9	June 2 4.3	June 4 6.0	June 6 22.9	11 7.3	May 2 13.1 N.
23 16.1	24 22.3	10 11.2	12 12.9	15 15.8	20 0.2	9 6.7 S.
31 5.6	June 1 11.8	18 18.1	20 19.8	24 8.8	28 17.2	16 0.2 N.
June 7 19.1	9 1.3					22 17.8 S.
Dec. 13 19.9	Dec. 15 2.2	Dec. 13 23.0	Dec. 16 0.7	Dec. 15 11.4	Dec. 19 19.8	Dec. 17 9.7 N.
21 9.3	22 15.6	22 5.9	24 7.6	24 4.3	28 12.7	24 3.3 S.
28 22.8	30 5.0	30 12.8	32 14.5	32 21.2		30 20.8 N.
Period of Ariel,		2 12.489		Period of Titania,		8 16.942
Period of Umbriel,		4 3.460		Period of Oberon,		13 11.119

NOTE.—For Ariel only every third elongation is given, and for Umbriel every alternate one. The intermediate ones may be found by adding multiples of the period of the satellite.



APPARENT ORBIT OF THE SATELLITE OF NEPTUNE IN 1885,  
AS SEEN IN AN INVERTING TELESCOPE.

WASHINGTON MEAN TIMES OF ELONGATIONS.

South West.	North East.	South West.	North East.	South West.	North East.
d h	d h	d h	d h	d h	d h
Jan. 4 1.4	Jan. 1 3.0	Aug. 27 2.6	Aug. 30 1.1	Oct. 30 18.0	Nov. 2 16.6
9 22.5	7 0.0	Sept. 1 23.6	Sept. 4 22.2	Nov. 5 15.1	8 13.7
15 19.5	12 21.1	7 20.7	10 19.2	11 12.1	14 10.7
21 16.6	18 18.1	13 17.7	16 16.3	17 9.2	20 7.7
	24 15.2	19 14.7	22 13.3	23 6.2	26 4.8
27 13.6	30 12.2	25 11.8	28 10.4	29 3.2	Dec. 2 1.8
Feb. 2 10.7	Feb. 5 9.3	Oct. 1 8.8	Oct. 4 7.4	Dec. 5 0.3	7 22.9
8 7.8	11 6.4	7 5.8	10 4.4	10 21.3	13 19.9
14 4.9	17 3.5	13 2.9	16 1.5	16 18.3	19 16.9
20 1.9	23 0.5	18 23.9	21 22.5	22 15.4	25 14.0
25 23.0	28 21.5	24 21.0	27 19.6	28 12.4	31 11.0

The above times are those of each passage of the satellite through an apsis of its apparent orbit. The position of the satellite at any other time may be found by measuring around the orbit from the apsis last passed through, remembering that the radius vector of the satellite describes equal areas in equal times.

Period of the satellite of Neptune,  $5^d 21^h.045$ .

In the above diagrams, the central circle represents the planet, and is on the same scale as the orbits.

WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

	d	h	m		d	h	m		d	h	m	
Jan.	3	5	-	♂ ☉ Inferior.	7	14	-	♂ ☽ greatest elong. E.	19	26	-	
	4	7	24	♂ ☽	13	12	27	♂ ☽	13	27	-	♂ - 0 12
	6	5	-	♂ ☽ Stationary.	14	3	0	♂ ☽	14	3	0	♂ + 0 6
	6	6	50	♂ ☽	15	13	55	♂ ☽	15	13	55	♂ + 6 21
	9	0	-	♂ ☽ greatest Hel. Lat. N.	16	8	42	♂ ☽	16	8	42	♂ + 2 13
	13	3	34	♂ ☽	16	17	-	♂ ☽ Stationary.	18	8	20	♂ + 4 1
	13	20	42	♂ ☽	18	8	20	♂ ☽	21	3	-	♂ Stationary.
	14	3	-	♂ ☽ Stationary.	21	3	-	♂ ☽	23	2	5	♂ ☽ + 4 37
	16	6	48	♂ ☽	23	2	5	♂ ☽	25	12	16	♂ ☽ + 1 17
	23	17	-	♂ ☽	25	12	16	♂ ☽	27	10	-	♂ ☉ Inferior.
	24	11	34	♂ ☽	27	10	-	♂ ☽	28	1	-	♂ ☽ + 1 42
	25	20	-	♂ ☽ greatest elong. W. 24 53	28	1	-	♂ ☽	30	11	-	♂ ☽ in ☽
	26	9	2	♂ ☽	30	11	-	♂ ☽	4	0	-	♂ ☽ Superior.
	29	15	-	♂ ☽ Stationary.	May	4	0	♂ ☽	10	16	-	♂ ☽ in Aphelion.
	30	8	-	♂ ☽ in ☽	10	16	-	♂ ☽	11	2	-	♂ ☽ Stationary.
Feb.	31	14	7	♂ ☽	11	2	-	♂ ☽	11	6	-	♂ ☽
	1	12	-	♂ ☽ in ☽	11	6	-	♂ ☽	12	10	55	♂ ☽ + 2 3
	2	15	25	♂ ☽	12	10	55	♂ ☽	12	10	59	♂ ☽ - 0 22
	3	22	-	♂ ☽ greatest Hel. Lat. S.	12	10	59	♂ ☽	12	15	-	♂ ☽ - 2 27
	8	9	-	♂ ☽	13	0	-	♂ ☽	13	19	47	♂ ☽ + 2 15
	10	19	-	♂ ☽	13	19	47	♂ ☽	14	1	17	♂ ☽ + 3 47
	11	7	-	♂ ☽ in Aphelion.	14	1	17	♂ ☽	15	21	35	♂ ☽ + 4 2
	11	16	-	♂ ☽	15	21	35	♂ ☽	16	22	-	♂ ☽
	12	17	18	♂ ☽	16	22	-	♂ ☽	20	9	37	♂ ☽ + 4 17
	12	17	42	♂ ☽	20	9	37	♂ ☽	22	16	38	♂ ☽ + 1 11
	14	10	44	♂ ☽	22	16	38	♂ ☽	23	11	-	♂ ☽ in ☽
	16	4	-	♂ ☽ Stationary.	23	11	-	♂ ☽	23	19	-	♂ ☽ greatest elong. W. 24 59
	18	14	-	♂ ☽	23	19	-	♂ ☽	29	19	-	♂ ☽ α Leonis . . ☽ + 0 41
	20	17	29	♂ ☽	29	19	-	♂ ☽	30	4	-	♂ ☽
	22	15	21	♂ ☽	30	4	-	♂ ☽	31	1	-	♂ ☽ greatest Hel. Lat. S.
	27	18	43	♂ ☽	31	1	-	♂ ☽	5	1	-	♂ ☽ Stationary.
	28	2	-	♂ ☽ in Perihelion.	5	1	-	♂ ☽	5	2	-	♂ ☽ + 0 48
Mar.	1	23	59	♂ ☽	5	2	-	♂ ☽	7	5	-	♂ ☽ - 1 32
	4	2	-	♂ ☽ greatest Hel. Lat. S.	7	5	-	♂ ☽	10	6	-	♂ ☽
	5	18	-	♂ ☽ in Aphelion.	10	6	-	♂ ☽	10	7	49	♂ ☽ + 2 21
	6	21	-	♂ ☽	10	7	49	♂ ☽	10	7	55	♂ ☽ + 3 51
	7	3	-	♂ ☽	10	7	55	♂ ☽	10	22	57	♂ ☽ + 2 57
	13	1	-	♂ ☽ Superior.	12	13	19	♂ ☽	12	22	54	♂ ☽ + 5 48
	15	1	42	♂ ☽	12	22	54	♂ ☽	16	21	44	♂ ☽ + 3 44
	15	12	50	♂ ☽	16	21	44	♂ ☽	18	6	-	♂ ☽
	16	-	-	♂ ☽ eclipsed, vis. at Wash.	18	6	-	♂ ☽	18	22	15	♂ ☽ + 0 55
	16	8	2	♂ ☽	18	22	15	♂ ☽	19	1	-	♂ ☽ in ☽
	19	8	-	♂ ☽ enters ♑, Spring com.	19	1	-	♂ ☽	19	10	-	♂ ☽
	19	23	56	♂ ☽	19	10	-	♂ ☽	20	14	-	♂ ☽ enters ♊, Summer com.
	20	15	-	♂ ☽	20	14	-	♂ ☽	23	11	-	♂ ☽ + 1 41
	21	22	28	♂ ☽	23	11	-	♂ ☽	23	15	-	♂ ☽ in Perihelion.
	22	2	-	♂ ☽ in ☽	23	15	-	♂ ☽	26	3	-	♂ ☽ in Perihelion.
	26	21	57	♂ ☽	26	3	-	♂ ☽	26	22	-	♂ ☽ Superior.
	27	10	-	♂ ☽	26	22	-	♂ ☽	1	7	-	♂ ☽ in ☽
	27	16	-	♂ ☽ in Perihelion.	1	7	-	♂ ☽	3	7	-	♂ ☽ Apogee.
	28	4	-	♂ ☽ greatest Hel. Lat. S.	3	7	-	♂ ☽	3	23	-	♂ ☽ greatest Hel. Lat. N.
	29	7	5	♂ ☽	July	3	23	♂ ☽				
	29	-	-	♂ ☽ eclipsed, invis. at Wash.								
Apr.	7	0	-	♂ ☽ greatest Hel. Lat. N.								

WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

July	d	h	m		d	h	m		d	h	m	
	7	18	59	$\delta \psi \zeta$ . . . . .	Sept. 29	23	-	$\delta \psi \zeta$ . . . . .	greatest Hel. Lat. N. °			
	9	3	44	$\delta \psi \zeta$ . . . . .	30	13	-	$\delta \psi \zeta$ . . . . .				
	10	5	48	$\delta \psi \zeta$ . . . . .	30	18	9	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	12	18	57	$\delta \psi \zeta$ . . . . .	Oct. 3	2	5	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	12	22	21	$\delta \psi \zeta$ . . . . .	4	8	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	14	14	2	$\delta \psi \zeta$ . . . . .	5	23	49	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	16	6	37	$\delta \psi \zeta$ . . . . .	6	18	56	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	16	21	-	$\delta \psi \zeta$ . . . . .	7	2	45	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	17	23	-	$\delta \psi \zeta$ . . . . .	10	18	39	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	20	1	-	$\delta \psi \zeta$ . . . . .	15	17	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	25	14	-	$\delta \psi \zeta$ . . . . .	16	10	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	27	10	-	$\delta \psi \zeta$ . . . . .	19	20	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
Aug.	4	3	49	$\delta \psi \zeta$ . . . . .	20	19	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	4	4	-	$\delta \psi \zeta$ . . . . .	21	2	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	5	3	-	$\delta \psi \zeta$ . . . . .	23	9	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	5	14	-	$\delta \psi \zeta$ . . . . .	24	20	58	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	5	15	-	$\delta \psi \zeta$ . . . . .	28	0	4	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	6	3	-	$\delta \psi \zeta$ . . . . .	31	11	7	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	6	15	-	$\delta \psi \zeta$ . . . . .	Nov. 2	14	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	6	21	5	$\delta \psi \zeta$ . . . . .	2	16	12	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	6	21	48	$\delta \psi \zeta$ . . . . .	3	5	17	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	8	1	-	$\delta \psi \zeta$ . . . . .	7	3	47	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	11	9	2	$\delta \psi \zeta$ . . . . .	7	21	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	11	15	36	$\delta \psi \zeta$ . . . . .	10	2	35	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	11	19	12	$\delta \psi \zeta$ . . . . .	15	15	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	12	17	49	$\delta \psi \zeta$ . . . . .	21	4	55	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	17	16	-	$\delta \psi \zeta$ . . . . .	22	23	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	19	0	-	$\delta \psi \zeta$ . . . . .	24	5	26	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	19	14	-	$\delta \psi \zeta$ . . . . .	28	16	12	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	23	21	-	$\delta \psi \zeta$ . . . . .	30	5	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	26	18	-	$\delta \psi \zeta$ . . . . .	30	5	24	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	27	0	-	$\delta \psi \zeta$ . . . . .	30	13	6	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	27	20	-	$\delta \psi \zeta$ . . . . .	Dec. 3	6	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	31	10	6	$\delta \psi \zeta$ . . . . .	7	13	9	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
Sept.	2	1	-	$\delta \psi \zeta$ . . . . .	8	6	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	3	9	27	$\delta \psi \zeta$ . . . . .	8	9	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	4	13	28	$\delta \psi \zeta$ . . . . .	8	18	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	7	10	12	$\delta \psi \zeta$ . . . . .	10	6	19	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	8	-	-	$\delta \psi \zeta$ . . . . .	12	0	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	8	4	55	$\delta \psi \zeta$ . . . . .	16	14	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	8	5	-	$\delta \psi \zeta$ . . . . .	18	11	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	9	6	34	$\delta \psi \zeta$ . . . . .	18	14	24	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	10	16	28	$\delta \psi \zeta$ . . . . .	20	22	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	11	14	-	$\delta \psi \zeta$ . . . . .	21	12	6	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	12	1	-	$\delta \psi \zeta$ . . . . .	25	17	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	15	0	-	$\delta \psi \zeta$ . . . . .	25	18	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	15	4	-	$\delta \psi \zeta$ . . . . .	26	16	19	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	19	14	-	$\delta \psi \zeta$ . . . . .	26	21	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	22	4	-	$\delta \psi \zeta$ . . . . .	27	15	55	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	23	-	-	$\delta \psi \zeta$ . . . . .	27	19	41	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	24	-	-	$\delta \psi \zeta$ . . . . .	28	10	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	25	14	-	$\delta \psi \zeta$ . . . . .	28	18	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	26	16	-	$\delta \psi \zeta$ . . . . .	30	11	-	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .
	27	15	7	$\delta \psi \zeta$ . . . . .				$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .	$\delta \psi \zeta$ . . . . .

## POSITIONS OF OBSERVATORIES.

(North Latitudes and West Longitudes are Considered Positive.)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude	
				From Washington.	From Greenwich.
Åbo . . . . .	+ 60° 26' 56".8	- 9' 53.5"	9.998902	- 6 37 20.3	- 1 29 8.2
Adelaide . . . . .	- 34 57	+ 10 47.8	9.999526	- 14 22 33.1	- 9 14 21.0
Albany . . . . .	+ 42 39 49.5	- 11 28.2	9.999336	- 0 13 12.87	+ 4 54 59.22
Alfred . . . . .	+ 42 15 19.8	- 11 27.2	9.999346	+ 0 2 55.00	+ 5 11 7.09
Algier . . . . .	+ 36 45 2.7	- 11 1.6	9.999483	- 5 20 23.48	- 0 12 11.39
Allegheny . . . . .	+ 40 27 41.6	- 11 21.6	9.999391	+ 0 11 50.84	+ 5 20 2.93
Altona . . . . .	+ 53 32 45.3	- 11 0.8	9.999063	- 5 47 58.44	- 0 39 46.35
Amherst . . . . .	+ 42 22 15.6	- 11 27.5	9.999343	- 0 18 4.8	+ 4 50 7.3
Annapolis . . . . .	+ 38 58 53.5	- 11 15.0	9.999428	- 0 2 15.60	+ 5 5 56.49
Ann Arbor . . . . .	+ 42 16 48.0	- 11 27.3	9.999346	+ 0 26 43.10	+ 5 34 55.19
Armagh . . . . .	+ 54 21 12.7	- 10 54.9	9.999043	- 4 41 36.6	+ 0 26 35.5
Athens . . . . .	+ 37 58 20.0	- 11 9.4	9.999453	- 6 43 7.8	- 1 34 55.7
Berlin . . . . .	+ 52 30 16.7	- 11 7.7	9.999088	- 6 1 47.00	- 0 53 34.91
Berne . . . . .	+ 46 57 8.7	- 11 20.2	9.999227	- 5 37 58.1	- 0 29 46.0
Bethlehem . . . . .	+ 40 36 23.9	- 11 22.2	9.999388	- 0 6 40.19	+ 5 1 31.90
Birr Castle . . . . .	+ 53 5 47.0	- 11 3.9	9.999074	- 4 36 31.2	+ 0 31 40.9
Bologna . . . . .	+ 44 29 47.0	- 11 30.5	9.999289	- 5 53 36.7	- 0 45 24.6
Bonn . . . . .	+ 50 43 45.0	- 11 17.3	9.999132	- 5 36 35.38	- 0 28 23.29
Bothkamp . . . . .	+ 54 12 9.6	- 10 56.0	9.999047	- 5 48 42.9	- 0 40 30.8
Breslau . . . . .	+ 51 6 56.5	- 11 15.4	9.999122	- 6 16 20.80	- 1 8 8.71
Brussels . . . . .	+ 50 51 10.5	- 11 16.8	9.999129	- 5 25 40.7	- 0 17 28.6
Cambridge (England) . . . . .	+ 52 12 51.6	- 11 9.4	9.999095	- 5 8 34.84	- 0 0 22.75
Cambridge (Mass.) . . . . .	+ 42 22 48.3	- 11 27.6	9.999343	- 0 23 41.11	+ 4 44 30.98
Cape of Good Hope . . . . .	- 33 56 3.4	+ 10 39.0	9.999550	- 6 22 7.1	- 1 13 55.0
Chapultepec . . . . .	+ 19 25 17.5	- 7 12.0	9.999841	+ 1 28 26.15	+ 6 36 38.24
Charkow . . . . .	+ 50 0 10.2	- 11 20.5	9.999150	- 7 33 6.8	- 2 24 54.7
Chicago . . . . .	+ 41 50 1.0	- 11 26.2	9.999357	+ 0 42 14.69	+ 5 50 26.78
Christiania . . . . .	+ 59 54 43.7	- 10 0.2	9.998914	- 5 51 5.94	- 0 42 53.85
Cincinnati (New Obs.) . . . . .	+ 39 8 35.5	- 11 15.8	9.999424	+ 0 29 29.33	+ 5 37 41.42
Cincinnati (Old Obs.) . . . . .	+ 39 6 26.5	- 11 15.6	9.999425	+ 0 29 46.85	+ 5 37 58.94
Clinton . . . . .	+ 43 3 17.0	- 11 28.9	9.999326	- 0 6 34.65	+ 5 1 37.44
Coimbra . . . . .	+ 40 12 25.8	- 11 20.6	9.999398	- 4 34 37.6	+ 0 33 34.5
Copenhagen . . . . .	+ 55 41 13.6	- 10 43.9	9.999011	- 5 58 31.3	- 0 50 19.2
Cordoba . . . . .	- 31 25 15.4	+ 10 13.5	9.999608	- 0 51 27.0	+ 4 16 45.1
Cracow . . . . .	+ 50 3 50.0	- 11 20.3	9.999149	- 6 28 2.6	- 1 19 50.5
Dantzic . . . . .	+ 54 21 18.0	- 10 54.9	9.999043	- 6 22 51.4	- 1 14 39.3
Dorpat . . . . .	+ 58 22 47.4	- 10 17.6	9.998948	- 6 55 5.6	- 1 46 53.5
Dublin . . . . .	+ 53 23 13	- 11 1.9	9.999066	- 4 42 50	+ 0 25 22
Düsseldorf . . . . .	+ 51 12 25	- 11 15.0	9.999120	- 5 35 17	- 0 27 5
Dun Echt . . . . .	+ 57 9 36	- 10 30.2	9.998977	- 4 58 32.1	+ 0 9 40.0
Durham . . . . .	+ 54 46 6.2	- 10 51.6	9.999033	- 5 1 52.3	+ 0 6 19.8
Edinburgh . . . . .	+ 55 57 23.2	- 10 41.5	9.999005	- 4 55 29.04	+ 0 12 43.05
Florence . . . . .	+ 43 46 4.1	- 11 20.9	9.999308	- 5 53 13.6	- 0 45 1.5
Geneva . . . . .	+ 46 11 58.8	- 11 30.1	9.999246	- 5 32 48.86	- 0 24 36.77
Georgetown . . . . .	+ 38 54 26.2	- 11 14.6	9.999430	+ 0 0 6.20	+ 5 8 18.29
Glasgow (Missouri) . . . . .	+ 39 16 16.8	- 11 16.4	9.999421	+ 1 3 5.93	+ 6 11 18.02
Glasgow (Scotland) . . . . .	+ 55 52 42.8	- 10 42.2	9.999006	- 4 51 1.5	+ 0 17 10.6

## POSITIONS OF OBSERVATORIES.

(North Latitudes and West Longitudes are Considered Positive.)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude	
				From Washington.	From Greenwich.
				<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Göttingen. . . . .	+ 51° 31' 47.9	- 11' 13.3	9.999112	- 5 47 58.33	- 0 39 46.24
Gotha . . . . .	+ 50 56 37.5	- 11 16.3	9.999127	- 5 51 2.62	- 0 42 50.53
Greenwich . . . . .	+ 51 28 38.4	- 11 13.6	9.999113	- 5 8 12.09	0 0 0
Hamburg. . . . .	+ 53 33 7.0	- 11 0 8	9.999062	- 5 48 5.8	- 0 39 53.7
Hanover . . . . .	+ 43 42 15	- 11 29.8	9.999309	- 0 19 4.13	+ 4 49 7.96
Hastings-on-Hudson .	+ 40 59 25	- 11 23.6	9.999378	- 0 12 42.4	+ 4 55 29.7
Haverford . . . . .	+ 40 0 36.5	- 11 19.8	9.999402	- 0 6 59.34	+ 5 1 12.75
Helsingfors . . . . .	+ 60 9 43.3	- 9 57.1	9.998909	- 6 48 1.25	- 1 39 49.16
Hudson . . . . .	+ 41 14 42.6	- 11 24.4	9.999371	+ 0 17 32.06	+ 5 25 44.15
Kasan . . . . .	+ 55 47 24.2	- 10 43.0	9.999009	- 8 24 41.0	- 3 16 28.9
Kew . . . . .	+ 51 28 6	- 11 13.6	9.999114	- 5 6 57.0	+ 0 1 15.1
Kiel . . . . .	+ 54 20 29.7	- 10 55.0	9.999043	- 5 48 47.85	- 0 40 35.76
Kiew . . . . .	+ 50 27 11.1	- 11 18.6	9.999139	- 7 10 12.73	- 2 2 0.64
Königsberg . . . . .	+ 54 42 50.6	- 10 52.0	9.999034	- 6 30 11.00	- 1 21 58.91
Kremsmünster . . . .	+ 48 3 23.7	- 11 27.0	9.999199	- 6 4 44.3	- 0 56 32.2
Leiden . . . . .	+ 52 9 20.0	- 11 9.8	9.999097	- 5 26 8.44	- 0 17 56.35
Leipzig . . . . .	+ 51 20 6.3	- 11 14.3	9.999117	- 5 57 46.11	- 0 49 34.02
Leyton . . . . .	+ 51 34 34	- 11 13.0	9.999111	- 5 8 11.22	+ 0 0 0.87
Lisbon ( <i>Marine Obs.</i> )	+ 38 42 17.6	- 11 13.5	9.999435	- 4 31 47.1	+ 0 36 25.0
Lisbon ( <i>Royal Obs.</i> )	+ 38 42 31.3	- 11 13.6	9.999435	- 4 31 27.41	+ 0 36 44.68
Liverpool. . . . .	+ 53 24 4	- 11 1.8	9.999066	- 4 55 54.9	+ 0 12 17.2
Lübec . . . . .	+ 53 51 31.2	- 10 58.6	9.999055	- 5 50 57.64	- 0 42 45.55
Lund . . . . .	+ 55 41 52.1	- 10 43.8	9.999011	- 6 0 57.11	- 0 52 45.02
Madison . . . . .	+ 43 4 36.7	- 11 28.9	9.999325	+ 0 49 25.8	+ 5 57 37.9
Madras . . . . .	+ 13 4 8.1	- 5 3.3	9.999926	- 10 29 11.5	- 5 20 59.4
Madrid . . . . .	+ 40 24 30.0	- 11 21.4	9.999393	- 4 53 26.7	+ 0 14 45.4
Manheim . . . . .	+ 49 29 11.0	- 11 22.5	9.999163	- 5 42 2.61	- 0 33 50.52
Marburg . . . . .	+ 50 48 46.9	- 11 16.9	9.999130	- 5 43 17.1	- 0 35 5.0
Markree . . . . .	+ 54 10 31.8	- 10 56.2	9.999047	- 4 34 23.7	+ 0 33 48.4
Marseilles . . . . .	+ 43 18 19.1	- 11 29.3	9.999320	- 5 29 46.73	- 0 21 34.64
Melbourne . . . . .	- 37 49 53.3	+ 11 8.6	9.999456	- 14 48 6.9	- 9 39 54.8
Mexico . . . . .	+ 19 26 1.3	- 7 12.2	9.999840	+ 1 28 14.58	+ 6 36 26.67
Milan . . . . .	+ 45 27 59.2	- 11 30.6	9.999265	- 5 44 58.06	- 0 36 45.97
Modena . . . . .	+ 44 38 52.8	- 11 30.6	9.999285	- 5 51 54.9	- 0 43 42.8
Montsouris . . . . .	+ 48 49 18.0	- 11 24.8	9.999180	- 5 17 32.77	- 0 9 20.68
Moscow . . . . .	+ 55 45 19.8	- 10 43.3	9.999009	- 7 38 29.0	- 2 30 16.9
Mount Hamilton . . .	+ 37 21 3	- 11 5.6	9.999468	+ 2 58 14.6	+ 8 6 26.7
Munich . . . . .	+ 48 8 45.5	- 11 26.7	9.999197	- 5 54 38.22	- 0 46 26.13
Naples . . . . .	+ 40 51 45.4	- 11 23.1	9.999381	- 6 5 13.0	- 0 57 0.9
Neuchatel . . . . .	+ 46 59 51.0	- 11 29.1	9.999226	- 5 36 2.3	- 0 27 50.2
New Haven. . . . .	+ 41 18 36.5	- 11 24.6	9.999370	- 0 16 29.90	+ 4 51 42.19
New York ( <i>Columb. Coll.</i> )	+ 40 45 23.1	- 11 22.7	9.999384	- 0 12 18.40	+ 4 55 53.69
New York ( <i>RUTHERFORD</i> )	+ 40 43 48.5	- 11 22.6	9.999384	- 0 12 15.47	+ 4 55 56.62
Nicolaeff . . . . .	+ 46 58 20.6	- 11 29.2	9.999226	- 7 16 6.2	- 2 7 54.1
Odessa . . . . .	+ 46 28 36	- 11 29.8	9.999239	- 7 11 14.4	- 2 3 2.3
Ogden. . . . .	+ 41 13 8.6	- 11 24.3	9.999372	+ 2 19 47.52	+ 7 27 59.61
O-Gyalla . . . . .	+ 47 52 43.4	- 11 27.4	9.999204	- 6 20 57.68	- 1 12 45.59

## POSITIONS OF OBSERVATORIES.

(North Latitudes and West Longitudes are Considered Positive.)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude	
				From Washington.	From Greenwich.
Olmütz . . . . .	+ 49° 35' 43"	- 11' 22.1"	9.999160	- 6 17 14.7	- 1 9 2.6
Oxford ( <i>Radcliffe</i> ) . . .	+ 51 45 36.0	- 11 12.0	9.999106	- 5 3 9.5	+ 0 5 2.6
Oxford ( <i>University</i> ) . . .	+ 51 45 34.2	- 11 12.0	9.999106	- 5 3 11.69	+ 0 5 0.40
Padua . . . . .	+ 45 24 2.5	- 11 30.6	9.999266	- 5 55 41.22	- 0 47 29.13
Palermo . . . . .	+ 38 6 44	- 11 10.2	9.999449	- 6 1 37.1	- 0 53 25.0
Paramatta . . . . .	- 33 48 49.8	+ 10 37.8	9.999553	- 15 12 18.3	- 10 4 6.2
Paris . . . . .	+ 48 50 11.8	- 11 24.8	9.999179	- 5 17 33.11	- 0 9 21.02
Philadelphia . . . . .	+ 39 57 7.5	- 11 19.5	9.999404	- 0 7 33.64	+ 5 0 38.45
Pola . . . . .	+ 44 51 49.0	- 11 30.6	9.999280	- 6 3 35.27	- 0 55 23.18
Potsdam . . . . .	+ 52 22 56	- 11 8.4	9.999091	- 6 0 29	- 0 52 17
Poughkeepsie . . . . .	+ 41 41 18	- 11 25.8	9.999360	- 0 12 38.5	+ 4 55 33.6
Prague . . . . .	+ 50 5 18.8	- 11 20.2	9.999148	- 6 5 53.5	- 0 57 41.4
Princeton . . . . .	+ 40 20 57.8	- 11 21.2	9.999394	- 0 9 34.54	+ 4 58 37.55
Pulkowa . . . . .	+ 59 46 18.7	- 10 1.8	9.998917	- 7 9 30.76	- 2 1 18.67
Quebec . . . . .	+ 46 48 17.3	- 11 29.4	9.999231	- 0 23 22.8	+ 4 44 49.3
Rio de Janeiro . . . . .	- 22 54 23.8	+ 8 14.0	9.999782	- 2 15 30.68	+ 2 52 41.41
Rochester . . . . .	+ 43 8 15	- 11 29.0	9.999324	+ 0 3 8	+ 5 11 20
Rome . . . . .	+ 41 53 53.7	- 11 26.3	9.999355	- 5 58 6.79	- 0 49 54.70
Saint Petersburg . . . . .	+ 59 56 29.7	- 9 59.8	9.998913	- 7 9 25.6	- 2 1 13.5
San Fernando . . . . .	+ 36 27 41.5	- 10 59.5	9.999490	- 4 43 22.5	+ 0 24 49.6
Santiago de Chile . . . . .	- 33 26 42.0	+ 10 34.4	9.999561	- 0 25 29.7	+ 4 42 42.4
Schwerin . . . . .	+ 53 37 38.2	- 11 0.2	9.999061	- 5 53 52.8	- 0 45 40.7
Senftenberg . . . . .	+ 50 5 10.1	- 11 20.2	9.999148	- 6 14 2.7	- 1 5 50.6
Speier . . . . .	+ 49 18 55.4	- 11 23.2	9.999167	- 5 41 57.7	- 0 33 45.6
Stockholm . . . . .	+ 59 20 33.0	- 10 6.9	9.998927	- 6 20 26.09	- 1 12 14.00
Stonyhurst . . . . .	+ 53 50 40	- 10 58.7	9.999055	- 4 58 19.41	+ 0 9 52.68
Strassburg ( <i>New Obs.</i> ) . . .	+ 48 34 59.7	- 11 25.5	9.999186	- 5 39 16.74	- 0 31 4.65
Strassburg ( <i>Old Obs.</i> ) . . .	+ 48 34 53.8	- 11 25.5	9.999186	- 5 39 14.58	- 0 31 2.49
Sydney . . . . .	- 33 51 41.1	+ 10 38.3	9.999552	- 15 13 2.7	- 10 4 50.6
Toulouse . . . . .	+ 43 36 47	- 11 29.7	9.999312	- 5 14 3.2	- 0 5 51.1
Turin . . . . .	+ 45 4 6.0	- 11 30.7	9.999275	- 5 39 0.5	- 0 30 48.4
Twickenham . . . . .	+ 51 27 4.2	- 11 13.7	9.999114	- 5 6 59.0	+ 0 1 13.1
Upsala . . . . .	+ 59 51 31.5	- 10 0.8	9.998915	- 6 18 42.7	- 1 10 30.6
Utrecht . . . . .	+ 52 5 10.5	- 11 10.2	9.999098	- 5 28 43.8	- 0 20 31.7
Venice . . . . .	+ 45 25 49.5	- 11 30.6	9.999266	- 5 57 37.5	- 0 49 25.4
Vienna ( <i>Josephstadt</i> ) . . .	+ 48 12 53.8	- 11 26.6	9.999195	- 6 13 37.4	- 1 5 25.3
Vienna ( <i>New Obs.</i> ) . . .	+ 48 13 55.4	- 11 26.5	9.999195	- 6 13 33.31	- 1 5 21.22
Vienna ( <i>Old Obs.</i> ) . . .	+ 48 12 35.5	- 11 26.6	9.999195	- 6 13 43.83	- 1 5 31.74
Warsaw . . . . .	+ 52 13 5.7	- 11 9.4	9.999095	- 6 32 19.5	- 1 24 7.4
Washington . . . . .	+ 38 53 38.8	- 11 14.5	9.999430	0 0 0	+ 5 8 12.09
West Point . . . . .	+ 41 23 31	- 11 24.9	9.999368	- 0 12 22.71	+ 4 55 49.38
Wilhelmshaven . . . . .	+ 53 31 52.0	- 11 0.9	9.999063	- 5 40 47.30	- 0 32 35.21
Williamstown ( <i>Mass.</i> ) . . .	+ 42 42 49	- 11 28.3	9.999334	- 0 15 18.6	+ 4 52 53.5
Williamstown ( <i>Victoria</i> ) . . .	- 37 52 7.2	+ 11 8.8	9.999455	- 14 47 50.9	- 9 39 38.8
Wilna . . . . .	+ 54 41 0	- 10 52.3	9.999035	- 6 49 24.0	- 1 41 11.9
Windsor . . . . .	- 33 36 28.9	+ 10 35.9	9.999558	- 15 11 33.8	- 10 3 21.7
Zürich . . . . .	+ 47 22 40.0	- 11 28.5	9.999216	- 5 42 24.7	- 0 34 12.6



# ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

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## PART I—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

THE greater portion of this Ephemeris, embracing the positions of the sun and moon; the distances of the moon from the centres of the sun and the four most conspicuous planets, and from certain fixed stars; the ephemerides of the planets Mercury, Venus, Mars, Jupiter, and Saturn, is designed for the special use of navigators. The remainder contains the ephemeris of Uranus and Neptune, the heliocentric co-ordinates of the seven major planets, the rectangular equatorial co-ordinates of the sun, the moon's longitude and latitude, data for the libration of the moon, the obliquity of the ecliptic, the equation of equinoxes, etc.

### TIME.

Astronomers make use of several different kinds of time: mean solar time; true, or apparent solar time; and sidereal time.

*Solar Time.*—Solar time is that used for all the purposes of ordinary life, and is measured by the daily motion of the sun. A *Solar Day* is the interval of time between two successive transits of the sun over the same meridian; and the hour-angle of the sun is called *Solar Time*. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the same meridian are not exactly equal, owing to the varying motion of the earth around the sun, and to the obliquity of the ecliptic. The intervals between the sun's transits over the meridian being unequal, it is impossible to regulate a clock or chronometer so that it shall accurately follow the sun.

To avoid the irregularity which would arise from using the true sun as the measure of time, a fictitious sun, called the *Mean Sun*, is supposed to move in the equator with a uniform velocity. This mean sun is supposed to keep, on the average, as near the real sun as is consistent with perfect uniformity of motion; it is sometimes in advance of it, and sometimes behind it, the greatest deviation being about 16 minutes of time.

*Mean Solar Time*, which is perfectly equable in its increase, is measured by the motion of this mean sun. The clocks in ordinary use and the chronometers used by navigators are regulated to mean solar time.

*True, or Apparent Solar Time* is measured by the motion of the real sun.

The difference between apparent and mean time is called the *Equation of Time*. By means of it we change apparent to mean time, or the reverse. Thus, if the apparent time be given, the mean time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found, on page I of the Calendar for each month. If the mean time be given, the apparent time is obtained by applying the equation of time as directed by the precept on page II of the Calendar.

*Sidereal Time.*—Sidereal time is measured by the daily motion of the stars; or, as it is used by astronomers, by the daily motion of that point in the equator from which the true right ascensions of the stars are counted. This point is the vernal equinox, and its hour-angle is called *Sidereal Time*. Astronomical clocks, regulated to sidereal time, are called sidereal clocks.

A *Sidereal Day* is the interval of time between the transit of the vernal equinox over any meridian, and its next succeeding return to the same meridian. It is about  $3^m 56^s$  shorter than the mean solar day; 365 $\frac{1}{4}$  solar days, or a year, being divided into 366 $\frac{1}{4}$  sidereal days. It is divided into 24 hours. The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the true vernal equinox over the upper meridian, and ending with its return to the same meridian. About March 21st of each year the sidereal clock agrees with the mean time, or ordinary clock; and the former gains on the latter about  $3^m 56^s$  per day, so that at the end of a year it will have gained an entire day, and will again agree with the mean time clock.

*Day*.—The *Civil Day*, according to the customs of society, commences at midnight, and comprises twenty-four hours from one midnight to the next following. The hours are counted from 0 to 12 from midnight to noon, after which they are again reckoned from 0 to 12 from noon to midnight. Thus the day is divided into two periods of 12 hours each; of which the first is marked A. M., and the last is marked P. M.

The *Astronomical Day* commences at noon on the civil day of the same date. It also comprises twenty-four hours; but they are reckoned from 0 to 24, and from the noon of one day to that of the next following. The astronomical as well as the civil time may be either apparent or mean, according as it is reckoned from apparent noon or from mean noon.

The civil day begins twelve hours before the astronomical day; therefore the first period of the civil day answers to the last part of the preceding astronomical day, and the last period of the civil day corresponds to the first part of the same astronomical day. Thus, January 9th, 2 o'clock, A. M., civil time, is January 8th, 14<sup>h</sup>, astronomical time; and January 9th, 2 o'clock, P. M., civil time, is also January 9th, 2<sup>h</sup>, astronomical time. The rule, then, for the transformation of civil time into astronomical time is this:—*If the civil time is marked A. M., take one from the day and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.*

*To change astronomical to civil time, we simply write P. M. after it, if it is less than 12 hours. If greater than 12 hours, we subtract 12 hours from it, add 1 to the days, and write A. M.* For example, January 3d, 23 hours, astronomical time, is January 4th, 11 o'clock, A. M., civil time.

If the longitude from Greenwich be expressed in time, and, when *west*, added to the local time, or, when *east*, subtracted from the local time, the result is the corresponding Greenwich time. If the local mean time is used, the result is the Greenwich mean time, which ordinarily is that required for the use of this Ephemeris. The rule is the same, whether we use mean or sidereal time.

#### THE CALENDAR.

The Calendar is divided into twelve months; and to each month are assigned eighteen pages, the contents of which are as follow:—

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension*, and *Declination*, and the *Equation of Time*. Adjoining columns contain the differences of these quantities for one hour. By multiplying this difference by the hours and parts of an hour from Greenwich apparent noon, and adding the amount to, or subtracting it from, the quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of any quantity for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, and, when greater accuracy is required, should be first interpolated for half the hours and parts of an hour of the Greenwich apparent time.

This page is chiefly used when the sun is observed on the meridian, and the local apparent time is 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>. The longitude from Greenwich expressed in time, if *west*, is at that instant the Greenwich apparent time, or time after Greenwich apparent noon; if *east*, it is time before

Greenwich apparent noon. The longitude of any place is therefore employed in reducing the quantities on this page to apparent noon at the place.

The right ascension of the sun thus reduced is the sidereal time of local apparent noon. The difference between it and the clock time of the meridian passage of the sun is the error of the clock on sidereal time.

The declination of the sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the sun.

As an example of the use of page I:—

Let the sun's declination be required at apparent noon, 1885, May 30th, at a place whose longitude is  $180^{\circ} 20'$ , or  $12^{\text{h}} 1^{\text{m}} 20^{\text{s}}$  west from Greenwich.

Local apparent time . . . . .	May 30,	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>
Longitude from Greenwich (additive) . . . . .		12	1	20
Greenwich apparent time . . . . .	May 30,	12	1	20

Reducing the minutes and seconds to decimals of an hour, we find that this moment is  $12^{\text{h}}.022$  after Greenwich apparent noon on May 30th, or  $11^{\text{h}}.978$  before Greenwich apparent noon on May 31st.

On page 74 of the Ephemeris we find that the change of declination in one hour is

May 30, at Greenwich apparent noon . . . . .	21'.89
May 31, at Greenwich apparent noon . . . . .	20.94
Difference for one day . . . . .	0.95

If we want to be very exact, we find the amount of this hourly difference for the time which is half way between Greenwich noon and the time of observation; that is, for 6 hours after Greenwich noon of the 30th, this being half of 12 hours. Six hours is 0.25 of a day; so the calculation is as follows:—

Difference for one hour, May 30 . . . . .	21'.89
Change for one day (or $0''.95$ ) $\times 0.25$ . . . . .	0.24
Difference at 6 hours after noon . . . . .	21.65
$21''.65 \times 12.022 = 260''.3 = 4' 20''.3$	
Declination at Greenwich noon, May 30 . . . . .	N. $21^{\circ} 50' 15''.8$
Change in 12.022 hours (additive) . . . . .	4 20.3
Sun's declination at time of observation . . . . .	N. $21^{\circ} 54' 36.1$

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given, the time is  $11^{\text{h}}.978$  before Greenwich noon of May 31st; half this interval is about 0.25 of a day, and the hourly motion for the middle of the interval is  $21''.18$ . Then, we find:—

Declination at Greenwich noon, May 31 . . . . .	N. $21^{\circ} 58' 50''.0$
Product of $21''.18 \times 11.978 = 253''.7$ (subtractive) . . . . .	4 13.7
Sun's declination at time of observation . . . . .	N. $21^{\circ} 54' 36.3$

It will always be well to make the calculation by both methods, as their agreement will show both to be right. In the above example, the results differ by only  $0''.2$ , a quantity too small to be considered an error.

At sea it is ordinarily sufficient to have the declination to the nearest half minute; and the reduction may be found by Table V of BOWDITCH's *American Practical Navigator*.

The equation of time, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the apparent time, or the time given by an observation of the sun, to obtain the mean time. The heading of the column directs the manner in which the equation is to be applied. When there is a change in the course of the month from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change takes place. The equation of time, as given on page I, is the mean time of apparent noon, or the hour-angle of the mean sun at that instant.

*The Sun's Semidiameter*, and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The sun's semidiameter is used in reducing the altitude of the upper or lower limb of the sun to the altitude of the centre; and in reducing the angular distance of the limb from the moon or some other object, to the distance from the centre of the sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the sun's centre over the wires of a transit-instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension*, and *Declination*, the *Equation of Time*, and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given, and may be used in reducing them to any Greenwich mean time. The hourly changes may be first interpolated for half the Greenwich time, when great precision is required, in the way described in explaining the calculation of the declination.

The right ascension and declination on pages I and II are affected by aberration, and therefore denote the apparent position of the true sun. Page II is more conveniently used when the mean time is known. This is the case in most observations of the sun out of the meridian, when the times have been noted by a clock or chronometer regulated to mean time. The quantities on this page can be reduced to mean noon of any place by interpolating for the longitude, as in the example of the sun's declination on the preceding page.

The sun's declination is required for finding the latitude of the place, the local time, and the sun's azimuth and amplitude, from observations of the sun.

The equation of time is needed in finding the mean time from observations of the sun, and the latitude from observations out of the meridian. The heading of the column directs the manner in which it is to be applied to mean time to obtain the apparent time.

The equation of time, as given on page II, is the apparent time of mean noon; and is equivalent to the hour-angle of the true sun at the instant of mean noon.

The sidereal time of mean noon is also the right ascension of the mean sun at Greenwich mean noon. It may be reduced for the longitude, or to any Greenwich mean time, by using the hourly difference,  $9^s.8565$ ; or by Table III, appended to this volume, for reducing intervals of mean solar to sidereal time. Table LI of Bowditch's *Navigator* may be used for the same purpose when only the nearest quarter of a second is required.

The sun's right ascension and the sidereal time of mean noon, or right ascension of the mean sun, are useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the R. A. of the mean sun for this time, as last explained: this being added to the local mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time, gives the interval of sidereal time from noon. Subtracting from this the corresponding reduction of a sidereal interval to a mean time interval, in Table II, appended to this volume, or Table LII of Bowditch's *Navigator*, will give the mean time required. This reduction may also be found by multiplying  $9^s.8296$  by the hours and parts of an hour of the given sidereal time.

As examples of the use of page II:—

1.—Let the sun's right ascension and the equation of time be required for 1885, May 15th,  $9^h 2^m 30^s$ , A. M., mean time, at a place whose longitude is  $100^\circ 10'$ , or  $6^h 40^m 40^s$ , west of Greenwich.

Local astronomical mean time	.	.	.	May 14,	$21^h 2^m 30^s$
Longitude from Greenwich (additive)	.	.	.	.	$6^h 40^m 40^s$
Greenwich mean time.	.	.	.	May 15,	$3^h 43^m 10^s = 3^h.7194$

<i>Sun's Right Ascension.</i>			<i>Equation of Time.</i>		
May 15, Greenwich noon .	<sup>h</sup> 3 <sup>m</sup> 29 <sup>s</sup> 38.86		May 15, noon .	<sup>m</sup> 3 <sup>s</sup> 51.64 (additive).	
H. D. $9^{\circ}.887 \times 3.7194$ .	$+ 0 \ 36.78$		H. D. $-0^{\circ}.031 \times 3.72$ .	$- 0.12$	
	<u>3 30 15.64</u>			<u>3 51.52</u>	

In this case, the hourly differences interpolated to half the interval, or 1<sup>h</sup>.9 after noon, have been used. The equation of time in this example is additive to mean time: Its reduction could also have been found by Table VI, A., of Bowditch's *Navigator*, but to seconds only.

2.—If the sidereal time is required for the same date and time, we have:—

May 15, Sidereal Time (at Greenwich mean noon) .	<sup>h</sup> 3 <sup>m</sup> 33 <sup>s</sup> 30.50
Hourly Difference $9^{\circ}.8565 \times 3.7194$ .	$+ 0 \ 36.66$
Add the local astronomical mean time .	<u>21 2 30.00</u>
The required sidereal time is (rejecting 24 <sup>h</sup> ) .	<u>0 36 37.16</u>

The reduction 0<sup>m</sup> 36<sup>s</sup>.66 could have been found in Table III corresponding to the Greenwich mean time 3<sup>h</sup> 43<sup>m</sup> 10<sup>s</sup>. Also, by Table LI of Bowditch's *Navigator*, the reduction is 0<sup>m</sup> 36<sup>s</sup>.7.

3.—On 1885, May 15, A. M., at a place whose longitude is 100° 10' W., suppose the sidereal time to be 0<sup>h</sup> 36<sup>m</sup> 37<sup>s</sup>.16, and that the corresponding mean time is required.

The astronomical day is May 14; the longitude in time, + 6<sup>h</sup> 40<sup>m</sup> 40<sup>s</sup>, or + 6<sup>h</sup>.678.

May 14, Sidereal Time (at Greenwich mean noon) .	<sup>h</sup> 3 <sup>m</sup> 29 <sup>s</sup> 33.94
The H. D. $9^{\circ}.8565 \times 6.678$ , or the reduction for 6 <sup>h</sup> 40 <sup>m</sup> 40 <sup>s</sup> in Table III .	$+ 1 \ 5.82$
The sidereal time of local mean noon .	<u>3 30 39.76</u>
The given sidereal time (+ 24 <sup>h</sup> , if necessary for the following subtraction) .	<u>24 36 37.16</u>
Subtracting the first from the second gives the sidereal interval from noon .	<u>21 5 57.40 = 21<sup>h</sup>.0993</u>
— $9^{\circ}.8296 \times 21.0993$ , or the reduction for 21 <sup>h</sup> 5 <sup>m</sup> 57 <sup>s</sup> .4 in Table II .	$- 3 \ 27.40$
The required astronomical mean time is .	May 14, <u>21 2 30.00</u>

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude*, and *Latitude*, and the *Logarithm of the Radius Vector of the Earth*. The longitudes of the sun are the true longitudes, not corrected for aberration. The longitude is given in two columns, headed  $\lambda$  and  $\lambda'$ ;  $\lambda$  representing the sun's longitude counted from the true equinox of the date; and  $\lambda'$ , the same co-ordinate counted from the mean equinox of the beginning of the year, (January 0<sup>d</sup>.0). A column of hourly differences enables the computer to obtain the sun's longitude for any hour from noon. The hourly differences of the logarithm of the radius vector are likewise given. The latitude is referred to the ecliptic of the date.

The last column on page III contains the *Mean Time of Sidereal Noon*; that is, the number of hours, minutes and seconds after Greenwich mean noon when the first point of Aries passes the meridian of Greenwich. It may be reduced to any meridian by interpolating for the longitude, or to any Greenwich sidereal time by means of the hourly difference, — 9<sup>s</sup>.8296. The reduction, however, can be taken directly from Table II for reducing intervals of sidereal time to mean solar time; or, approximately, from Table LII of Bowditch's *Navigator*.

This column may be used in converting sidereal time to mean time instead of that on page II. As an illustration, let us take Example 3, above.

It is seen in advance that the sum of the mean time of sidereal noon and the given sidereal time is less than 24 hours. Were it more than 24 hours, the mean time of sidereal noon should be taken out for May 13, that is the preceding astronomical day.

May 14, the mean time of Greenwich sidereal noon is .	<sup>h</sup> 20 <sup>m</sup> 27 <sup>s</sup> 4.48
The H. D. $-9^{\circ}.8296 \times 6.678$ , or the reduction for long., Table II .	$- 1 \ 5.64$
The mean time of local sidereal noon .	<u>20 25 58.84</u>
Add the given sidereal time .	<u>0 36 37.16 = 0<sup>h</sup>.6103</u>
The sum is .	<u>21 2 36.00</u>
— $9^{\circ}.8296 \times 0.6103$ , or the reduction for 0 <sup>h</sup> 36 <sup>m</sup> 37 <sup>s</sup> .2 in Table II .	$- 0 \ 6.00$
The required astronomical mean time .	May 14, <u>21 2 30.00</u>

Page IV contains *The Moon's Semidiameter* and *Equatorial Horizontal Parallax*, for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of this quantity in one hour, by means of which it can be reduced to any other Greenwich mean time, in the same way as the sun's declination and the equation of time in the preceding examples. The sign plus or minus prefixed to the hourly differences, shows whether the horizontal parallax is increasing or decreasing.

The reduction of the moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.272. It may also be obtained from Table XI of BOWDITCH'S *Navigator*, or by simply computing the proportional part.

If, for example, the semidiameter of the moon is to be taken out for 1885, May 1, 10<sup>h</sup>, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of May 1 is 2''.7; then,

$$\text{as } 12^h : 10^h = 2''.7 : 2''.2,$$

which is the correction to be subtracted from the semidiameter at noon, because the semidiameter is decreasing. The moon's semidiameter then, for May 1, 10<sup>h</sup>, is 14' 56'' 2—0' 2'' 2, or 14' 54'' 0.

The moon's semidiameter and horizontal parallax are required for all observations of the moon. When great precision is needed, the hourly differences should be first interpolated for half the interval of Greenwich time from noon or midnight, and a correction applied to the horizontal parallax for the latitude of the place of observation.

The *Mean Time of the Moon's Upper Transit at Greenwich*, which is given on page IV to tenths of a minute, is also accompanied with a column of differences for one hour of longitude, by means of which, having the longitude turned into time, the local time of the moon's meridian passage at any other place may be computed. The reduction may be taken from BOWDITCH'S Table XXVIII by simple inspection. The last column of this page contains the *Age* of the moon, or the time elapsed since the preceding new moon, to tenths of a day.

Pages V—XII contain *The Moon's Right Ascension*, and *Declination*, for each day and hour of Greenwich mean time. They are accompanied with columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may be taken from a well-regulated chronometer, or obtained by applying the longitude, turned into time, to the local mean time of the observer. The right ascension, or declination, is taken out for the day and hour of the Greenwich mean time; the *Diff. for 1 Minute* multiplied by the minutes and parts of a minute of the Greenwich time; and the product added to, or subtracted from, the quantity, according as the quantity is increasing or decreasing.

Thus, suppose the moon's right ascension and declination are required for 1885, May 1, 10<sup>h</sup> 10<sup>m</sup> 30<sup>s</sup>, astronomical mean time at Greenwich:—

	<i>Right Ascension.</i>	<i>Declination.</i>
May 1, 10 <sup>h</sup> . . . . .	16 <sup>h</sup> 43 <sup>m</sup> 58.47 . . . . .	S. 17° 28' 42.2
Diff. 2 <sup>m</sup> .1003 × 10.500 . . . . .	= + 22.05 . . . . .	2 <sup>m</sup> .903 × 10.500 = — 0 30.5
May 1, 10 <sup>h</sup> 10 <sup>m</sup> 30 <sup>s</sup> . . . . .	16 44 20.52 . . . . .	S. 17 29 11.7

The differences interpolated for 5<sup>m</sup>.2 = 0<sup>h</sup>.09 are for the right ascension 2<sup>m</sup>.1003, and for the declination 2<sup>m</sup>.895, which may be used for greater precision.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the earth.

Pages XIII—XVIII contain the *Lunar Distances*, or the angular distances of the centre of the moon from the centre of the sun, and from the four larger planets and certain fixed stars, as they would appear to an observer at the centre of the earth. They are given for every third hour of Greenwich mean time, beginning at noon; the dates are therefore astronomical. All the distances that can be observed on the same day are grouped together under that date; and the columns are read from left to right, across both pages of the same opening. The letter W. or E. is affixed to the name of the sun, planet or star, to indicate that it is on the west, or east, side of the moon.

An observer on the earth's surface having measured a lunar distance, corrected it for errors of his instrument and for the semidiameter of the objects, and cleared it from the effects of refraction and parallax, finds the true, or geocentric, distance; that is, the distance as it would have appeared from the centre of the earth at the moment of observation. With this distance and the distances in the Ephemeris of the same bodies on the same day, the Greenwich mean time of the observation can be found.

To lessen the labor of computation, there is given in the Ephemeris, between every two successive distances, the logarithm of the seconds of time in which the distance changes 1"; or, as it is usually called, the *Proportional Logarithm of the Difference*. It is given for the middle instant of the two hours between which it is placed.

For computing the Greenwich time we have the following rule:—

*Find in the Almanac the two distances between which the true distance falls; take out the nearest of these, the hours of Greenwich time over it, and the P. L. of Diff. between them.*

*Find the difference between the true distance and the distance taken from the Almanac; and from the proportional logarithm of this difference, as found in the Navigator, subtract the P. L. of Diff. taken from the Almanac.*

*The result is the proportional logarithm of an interval of time to be added to the hours of Greenwich time, taken from the Almanac, when the earlier Almanac-distance is used; to be subtracted from the hours of Greenwich time, when the later Almanac-distance is used.*

Another method is, to add the common logarithm of the difference of the true and the Almanac-distances to the P. L. of Diff. of the Almanac; the sum will be the common logarithm of the correction to be applied to the hours of Greenwich time. The Table of *Logarithms of small Arcs in Space or Time*, given at the end of the volume for 1871, saves the operation of reducing degrees (or hours) and minutes to seconds, and the reverse.

As the P. L. of Diff. in the Ephemeris varies, the Greenwich time found by the methods just described may not be sufficiently exact. To correct it for such variation, or second difference, take the difference between the P. L. of Diff. used and the one which follows it in the Ephemeris, (or, more strictly, half the difference of the preceding and following ones). With this difference, and the first correction of the Greenwich time already found, enter Table I, appended to this volume, and take out the corresponding seconds, which are to be added to the approximate Greenwich time when the Prop. Logs. in the Ephemeris are decreasing; and subtracted when they are increasing.

Thus the Greenwich mean time of the observation can be obtained. If the observer has noted the time of observation by a chronometer, the difference of this chronometer-time and the Greenwich mean time will be the error of the chronometer on Greenwich time as found from the lunar distance. In this way lunar distances can be used as a check upon the chronometer. By a series of carefully observed lunar distances on both sides of the moon, the chronometer-error may generally be ascertained within 20 or 30 seconds.

If the observer has found the local mean time of observation from the observed altitude of one of the bodies, or by a watch regulated to that time by recent observations and corrected for change of longitude in the interval, the difference of this local time and the Greenwich time found from the lunar distance will be his longitude. A longitude derived by this method should always be considered as uncertain by 5' or more.

As an example of finding the Greenwich mean time from a lunar distance, suppose that in 1835, Feb. 19, about 6<sup>h</sup> of Greenwich mean time, the corrected distance of the moon's centre from that of the sun is 55° 50' 0" :—

Corrected distance	55° 50' 0"	
Distance in the Ephemeris, Feb. 19, VI <sup>h</sup>	55 44 40	P. L. 0.2840
Difference	0 5 20	P. L. 1.5283
		P. L. 1.2443
Time from VI <sup>h</sup> (after)	+ 0 10 15	
Corr. for 2d Diff., Table I	+ 1	
Greenwich mean time, Feb. 19.	6 10 16	

By a table of common logarithms, or a table of logarithms of small arcs, the reduction of the Greenwich time would be found thus:—

From Ephemeris . . . . .	P. L.	0.2840
Diff. of distances, $5' 20'' = 320''$ . . . . .	log	2.5052
Red. of Greenwich time, $+ 0^h 10^m 15^s = 615^s$ . . . . .	log	2.7892

The result is the same as by the previous method.

Pages 218—249 contain the geocentric ephemerides of the seven major planets. The positions are referred to the equator and true equinox of the date, and corrected for aberration; they are, therefore, apparent positions. All the data except meridian passage are given for the moment of Greenwich mean noon. The column *Meridian Passage* gives the hour, minute and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it has been observed for time, latitude or azimuth. The mode of reducing them to any instant of Greenwich mean time is the same as in the examples for the sun, previously given. The local mean time of passage across any other meridian can be found by dividing the daily differences by 24, and multiplying the quotient by the hours and fractions of the longitude of the place. The product is subtractive from the time of Greenwich passage when the place is east of Greenwich, and additive when west. The corrections can never exceed one-half the change for one day.

Pages 250—263 contain the heliocentric positions of the seven major planets, and the logarithms of their distances from the earth. The heliocentric longitude is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The daily motion is given for the moment of Greenwich mean noon. The column *Reduction to Orbit* gives the correction to be applied to the heliocentric longitudes in order to obtain the longitude counted along the orbit of the planet. This longitude is equal to the distance of the node from the mean equinox, plus the distance of the planet from the node. The heliocentric latitude is counted from the moving plane of the ecliptic. The *Logarithm of Radius Vector* is the logarithm of the distances of the centre of the planet from that of the sun, at each Greenwich mean noon given in the first column. The two last columns give, in the same way, the logarithm of the true distance of the centre of the planet from that of the earth. The one column gives the quantity for the Greenwich noon indicated on the left hand side of the page, and the other for the noon which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean noon of the day immediately following; in the case of Venus, Mars, Jupiter, and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 264—271 contain the rectangular co-ordinates of the centre of the sun, referred to the centre of the earth as the origin, and to the true equator and equinox of each date as the circle and point of reference. Each co-ordinate is given first for Greenwich mean noon, and in the column following for mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan. 0* give the corrections to be applied to the co-ordinates for noon in order to obtain the corresponding co-ordinates referred to the mean equator and the mean equinox of January 0.

Pages 272—275 give the longitude and latitude of the moon for every Greenwich mean noon and midnight. Both quantities are referred to the true ecliptic and equinox of the date.

Pages 276 and 277 contain the position of the moon's equator and the mean longitude of the moon, and a table for computing the libration of the moon. The epochs of greatest libration of the moon, together with the formulæ for finding the libration in longitude and latitude are given on page 418.

Page 278 contains, for each tenth Greenwich mean noon, the values of the principal elements arising from the motion of the equinox, and also the aberration and parallax of the sun. The column *Apparent Obliquity of the Ecliptic* (HANSEN) gives the true inclination of the earth's



equator to the ecliptic, without correction for the terms depending on the moon's longitude. The *Equation of Equinoxes* is really the astronomical nutation; that given *In Longitude* is the correction to be applied to the longitude of the body referred to the mean equinox, in order to obtain that longitude as referred to the true equinox. When the correction is positive, the true longitudes are greater than those referred to the mean equinox; while the contrary is true when the correction has the negative sign. The equation *In R. A.* is equal to that in longitude, multiplied by the cosine of the obliquity of the ecliptic.

The next column gives the *Precession of Equinoxes in Longitude*, from January 0 to each of the dates following. The *Sun's Aberration* is the quantity which is to be applied to the true longitude of the sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. The sun's equatorial horizontal parallax, given in the next column, is the angle subtended by the radius of the earth's equator, as seen from the centre of the sun.

## PART II—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Page 280 contains the formulæ for reducing the positions of the fixed stars, using the notation of BESSEL, and the constants of PETERS and STRUVE. The formulæ by which the star-numbers are computed are also given.

Pages 281—284 contain the logarithms of the *Besselian Star-Numbers*, *A*, *B*, *C*, *D*, for each Washington mean midnight. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given. If used in accordance with the English and French notation, the pair of quantities *A* and *B* must be interchanged with the pair *C* and *D*; that is, *A* must be interchanged with *C*, and *B* with *D*. In the first column along with the solar day is given, for certain dates, the sidereal hour and tenth of midnight. The sidereal time for which any set of quantities is given can be found by interpolation from these numbers.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:—

*Computation of the apparent place of  $\alpha$  Bootis for 1885, June 10, for the upper transit at Washington.*

(Star-Catalogue)	$\log a$	0.4492	$\log b$	8.3053 $\pi$	$\log c$	8.7758 $\pi$	$\log d$	8.5817 $\pi$
(Page 282)	$\log A$	9.6388	$\log B$	0.9942	$\log C$	0.5006 $\pi$	$\log D$	1.3043 $\pi$
(Star-Catalogue)	$\log a'$	1.2277 $\pi$	$\log b'$	9.7314	$\log c'$	9.7712	$\log d'$	9.4550 $\pi$
	$\log Aa$	0.0880	$\log Bb$	9.2995 $\pi$	$\log Cc$	9.2764	$\log Dd$	9.8860
	$\log Aa'$	0.8665 $\pi$	$\log Bb'$	0.7256	$\log Cc'$	0.2718 $\pi$	$\log Dd'$	0.7593

<i>Mean Place</i> , 1885.0, (Page 298)	$\alpha_0 = 14^{\text{h}} 10^{\text{m}} 24.9^{\text{s}} 0$	$\delta_0 = +19^{\circ} 46' 53''.54$
	$Aa = +1.224$	$Aa' = -7.35$
	$Bb = -0.199$	$Bb' = +5.31$
	$Cc = +0.189$	$Cc' = -1.87$
	$Dd = +0.769$	$Dd' = +5.75$
	$E = 0.000$	$\tau\mu' = -0.89$
	$\tau\mu = -0.035$	

<i>Apparent Place</i> , 1885, June 10,	$\alpha = 14^{\text{h}} 10^{\text{m}} 26.9^{\text{s}}$	$\delta = +19^{\circ} 46' 54.5''$
--	--	-----------------------------------

Pages 285—292 contain the *Independent Star-Numbers*, which can be used for the same purpose. The column  $\tau$  gives the fraction of the year from the beginning of the fictitious year to each date. These quantities are connected with those of BESSEL by the relations given on page 280, where are also found the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, *a*, *b*, *c*, *d*, *a'*, *b'*, *c'*, *d'*. The independent star-numbers, are given in order that the apparent place of the star may be determined when it is not convenient to compute these numbers.

The following is an example of the reduction of a star to apparent place by the independent star-numbers :—

*Computation of the apparent place of  $\alpha$  Bootis for 1885, June 10, for the upper transit at Washington.*

		$\alpha_0 = 14^{\text{h}} 10.4^{\text{m}}$		$\delta_0 = +19^{\circ} 46.9'$	
		$G = 3^{\text{h}} 13.9^{\text{m}}$		$G + \alpha = 17^{\text{h}} 24.3^{\text{m}}$	
		$H = 12^{\text{h}} 35.8^{\text{m}}$		$H + \alpha = 2^{\text{h}} 46.2^{\text{m}}$	
		(Page 288) $\log \frac{1}{r}$ 8.8239		$\log \frac{1}{r}$ 8.8239	
		$\log g$ 1.1198		$\log k$ 1.3096	
		$\log \sin (G + \alpha)$ 9.9947 $\pi$		$\log \sin (H + \alpha)$ 9.8221	
		$\log \tan \delta$ 9.5559		$\log \sec \delta$ 0.0264	
		$\log (g)$ 9.4943 $\pi$		$\log (k)$ 9.9820	
				$\tau \mu = -0.035$	
				<i>Apparent Right Ascension</i> = 14 10 26.93	
		$\log g$ 1.1198		$\log k$ 1.3096	
		$\log \cos (G + \alpha)$ 9.1907 $\pi$		$\log \cos (H + \alpha)$ 9.8738	
		$\log (g')$ 0.3105 $\pi$		$\log \sin \delta$ 9.5295	
				$\log (k')$ 0.7129	
		(Page 288) $\log i$ 0.1399 $\pi$		$\delta_0 = +19^{\circ} 46' 53.54''$	
		$\log \cos \delta$ 9.9736		$(g') = -2.04$	
		$\log (i)$ 0.1135 $\pi$		$(k') = +5.16$	
				$(i) = -1.30$	
				$\tau \mu' = -0.89$	
				<i>Apparent Declination</i> = + 19 46 54.5	

Pages 293—301 contain the mean places of three hundred and eighty-three stars, for the beginning of the fictitious year 1885, or the moment when the sun's mean longitude is  $280^{\circ}$ .

The annual variations are to be considered as the differential coefficients of each co-ordinate with respect to the time at the beginning of the year.

In order that the list of mean places of stars may serve the purpose of a working-catalogue for the convenient use of astronomers, the position of each of the northern circumpolar stars is given in duplicate, one position being for the upper and the other for the lower culmination. The positions for the lower culmination are marked S. P. In this case, the right ascensions are the sidereal times at which the star crosses the lower meridian; and, in order to have the expressions for the co-ordinates congruous in all cases, the declinations are counted from the equator through the north pole, and therefore exceed  $90^{\circ}$ . The time of observation and setting of the circle, in order to find a star on the meridian, are then obtained uniformly for all the stars.

Beginning with the volume for 1882, the number of stars has been greatly increased, in order to make the list more useful to field-astronomers. In order to show at a glance these additional stars, they are indicated in the list by an asterisk. \*

Pages 302—313 contain the apparent positions of the four north polar stars,  $\alpha$ ,  $\delta$ , and  $\lambda$  Ursæ Minoris, and 51 Cephei, for every upper transit at Washington. They include the terms depending on the moon's longitude. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26th is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 302, we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But, the lower transit following that of July 1st (page 308), does not take place until July 2.3. Hence, the lower transit of July 1st precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column of *Mean Solar Date*.

Pages 314—364 contain, for every tenth upper transit at Washington, the apparent places of those stars of the preceding list which are not marked with an asterisk. The mean solar date in each left hand column gives the day and tenth of the transit; so that each intermediate transit

\* It is contemplated to issue a supplement to the Ephemeris for 1884, containing apparent right ascensions of these additional stars for the years 1881—1884.

may be readily identified. Along with each co-ordinate is given, in small type, the change for ten days. This quantity is to be regarded as the differential coefficient corresponding to the dates for which the star-places are given.

Pages 365—376 contain the apparent right ascensions of all stars marked with an asterisk in the list of mean places. The apparent right ascension of each star is given only for that part of the year when it may readily be observed on the meridian. In the case of circumpolar stars, the right ascensions for lower, as well as upper, transit are given.

Pages 377—384 contain the apparent right ascension, declination, and semidiameter of the sun, and the sidereal time, all for Washington mean noon. Adjoining columns give the seconds of right ascension and of declination for apparent noon, that is, for the moment of transit of the sun's centre over the meridian of Washington. The hours and minutes of right ascension, and the degrees and minutes of declination are the same for both mean and apparent noon. In case they would have differed, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that there is always a correspondence between the two numbers. The hourly motions in right ascension and declination are given for the moment of mean noon, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the sun's centre over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich*.

Pages 385—392 contain the right ascension, declination, semidiameter, and parallax of the moon, at the moment of transit over the meridian of Washington. The mean time given in the second column is that of transit of the moon's centre over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington exceed those given in the column *Mean Time of Transit*, supposing the rate of change to be uniform and equal to what it is at the moment of transit over the meridian of Washington. The next four columns need no especial explanation, except that the differences for one hour of longitude are computed as if the motion of the moon in right ascension were uniform. By means of them, the position of the moon can be computed with astronomical accuracy at the moment of transit over any meridian not exceeding one hour in longitude from that of Washington, by taking account of second differences. With greater longitudes of the place, the accuracy of the result obtained in this way will diminish. The columns of sidereal time of semidiameter passing meridian, etc., do not seem to need any explanation, except that they all refer to the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When two opposite limbs are both so nearly full that they can be well observed, both are indicated; and the one which is deficient is printed in smaller type. When the illumination is so nearly equal that no choice can be made between them, both are printed in large type.

Pages 393—409 contain the geocentric apparent right ascensions and declinations of the seven major planets, and their semidiameters and horizontal parallaxes, for the moments of all those transits over the meridian of Washington which can be observed.

### PART III—PHENOMENA.

This portion of *The American Ephemeris and Nautical Almanac* gives the principal astronomical phenomena of the year, reduced to Washington mean time, except in the case of the eclipses and the data for the rings of Saturn, which are given in Greenwich mean time.

Pages 412—417 inclusive contain the elements necessary for computing the two eclipses of the sun which occur during the year.

The eclipse-elements are given for the moment of conjunction of the sun and moon in right ascension. The subsequent tables and results are not, however, computed from these



The quantities  $l$  and  $l'$  are the radii of the shadow-cones upon the fundamental plane,  $l$  corresponding to the penumbra, and  $l'$  to the umbra, or annulus. The notation is that of CHAUVE-  
NET'S *Spherical and Practical Astronomy*, in which  $l'$  is regarded as positive for an annular, and negative for a total, eclipse.

The angles  $f$  and  $f'$ , the tangents of which are given, are the angles which each element of the respective shadow-cones makes with the axis of the shadow; or, they are the semi-angles of the two cones.

At the bottom of the table are given the logarithms of the change of  $x$ ,  $y$  and  $\mu$ , in one minute, in order to facilitate the interpolation to any required moment.

The method of computing the eclipse from the given elements is as follows: It is premised that the moments of beginning and ending are those at which the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observa-  
tion. To find such distance and radius we compute—

(1) The co-ordinates,  $\xi$ ,  $\eta$ , and  $\zeta$ , of the observer, at some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase, together with their varia-  
tions for one minute.

(2) The co-ordinates  $x$  and  $y$  of the axis of the shadow at the same moment, which, with their variations for one minute, are taken from the tables of elements.

(3) Hence, the position and motion of the observer relative to the axis of the shadow.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follow:—

(1) Find the geocentric co-ordinates of the station referred to the earth's equator, which are represented by  $\rho \cos \varphi'$  and  $\rho \sin \varphi'$ ,  $\rho$  being the distance from the centre of the earth, and  $\varphi'$  the geocentric latitude. These may be obtained from geodetic tables, or may be computed from the following table by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

$\varphi$  being, as usual, the geographic latitude.

Table for Computing the Geocentric Co-ordinates of a Place.

$\varphi$	Log F.	Log G.
0°	0.00000	0.00302
5	0.00001	0.00300
10	0.00005	0.00297
15	0.00010	0.00292
20	0.00018	0.00284
25	0.00027	0.00275
30	0.00038	0.00264
35	0.00050	0.00252
40	0.00062	0.00239
45	0.00075	0.00226
50	0.00088	0.00213
55	0.00101	0.00201
60	0.00113	0.00189
65	0.00124	0.00178
70	0.00133	0.00169
75	0.00141	0.00161
80	0.00146	0.00155
85	0.00150	0.00152
90	0.00151	0.00151

For the assumed Greenwich mean time of computation, take from the table of elements the values of  $\sin d$ ,  $\cos d$ , and  $\mu$ . Put:

$\lambda$ , the longitude west from Greenwich. The co-ordinates of the observer will then be:—

$$\xi = \rho \cos \varphi' \sin (\mu - \lambda)$$

$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda)$$

$$\zeta = \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda)$$

and their variations in one minute of mean time will be:—

$$\xi' = [7.6398] \rho \cos \varphi' \cos (\mu - \lambda)$$

$$\eta' = [7.6398] \rho \cos \varphi' \sin d \sin (\mu - \lambda) = [7.6398] \xi \sin d$$

$\zeta'$  is not wanted.

(2) The co-ordinates  $x$  and  $y$  of the axis of the shadow are taken from the tables of elements for the same assumed moment of Greenwich mean time, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. The variations for one minute we represent by  $x'$  and  $y'$ . Their logarithms are given at the foot of the tables.

(3) The distance  $m$  and position-angle  $M$  of the axis of the shadow relative to the observer, and the relative motions,  $n$  and  $N$ , are computed by the formulæ:—

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

(4) The radius  $L$  of the shadow or penumbra at the distance  $\zeta$  from the fundamental plane is computed by the formula

$$L = l - \zeta \tan f$$

$l$  and  $f$  being found in the table of elements, and  $\zeta$  computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or end of the eclipse, we shall have—

$$m = L$$

But, as this condition can scarcely ever be fulfilled on a first trial, a correction  $\tau$  to the assumed time is computed thus: Find the angle  $\phi$  from the equation,

$$\sin \phi = \frac{m \sin (M - N)}{L}$$

There will be two values to this angle, of which one will be in the first and the other in the second quadrant when  $\sin \phi$  is positive, and one in the third and the other in the fourth when  $\sin \phi$  is negative. But, simplicity will be gained by taking only that value of  $\phi$  for which  $\cos \phi$  is positive. This value lies between the limits  $+90^\circ$  and  $-90^\circ$ . The correction  $\tau$  to the assumed time will be found in minutes, from—

For beginning:

$$\tau = - \frac{m \cos (M - N)}{n} - \frac{L \cos \phi}{n}$$

For ending:

$$\tau = - \frac{m \cos (M - N)}{n} + \frac{L \cos \phi}{n}$$

One such pair of values of  $\tau$  cannot, however, give the times of both beginning and ending with accuracy. To attain accuracy we must, in commencing the computation, assume two times, one as near as practicable to that of beginning, and another near that of ending. These approximate times may be derived from the chart of the eclipse. We shall thus have two pairs of values of  $\tau$ . The computation for the first assumed time will give a small and nearly correct value for the beginning of the eclipse, and a large value which, added to the assumed time, will give an inaccurate time of ending. The computation for the second assumed time will give a small and nearly correct value for the end, and a large negative and inaccurate one for the beginning. We shall thus deduce two times of beginning and two of ending, of each of which only one is to be considered approximately correct.

The more accurate times of beginning and ending may now be taken in place of the first assumed ones, and the computation may be repeated from the beginning, leading to a pair of values of  $\tau$ , which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors. The following theorem will, however, enable us to obtain a second approximation to the true times of each phase without repeating the computation.

**THEOREM.**—*The error of each result is approximately proportional to the square of the correction  $\tau$ , multiplied by the sine of the sun's hour-angle,  $(\mu-\lambda)$ , for the middle of the interval between the time of computation and that of the phase.*

To apply this theorem we find the two values of  $\tau^2 \sin(\mu-\lambda)$  corresponding to the required phase. We then find the ratio of these quantities—which will commonly be a large number, and divide the difference of the results by this ratio. The quotient will be a correction to be applied to the more accurate result in such a way as to make it deviate yet more from the less accurate one. This correction should be positive in the local forenoon, and negative in the afternoon, and its value should never materially exceed  $0^m.001 \tau^2$ .

Unless the times chosen for computation are unusually in error, say ten minutes or more, the corrected results thus obtained will be theoretically correct within less than a second. But to guard against numerical errors it is better, after making this final correction, to repeat the computations so far as to obtain new values of  $m$  and  $L$  for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, farther corrections and recomputations may be made by the computer according to his own judgment.

It may be remarked that the uncertainty of the ephemerides is such that a prediction may be several seconds in error from this unavoidable cause alone.

**Position-angle of Point of Contact.**—The position-angle,  $P$ , of the point of contact, reckoned from the north point of the sun's limb toward the east, is found by the formula

$$\text{For beginning:} \quad P = N - \phi \pm 180^\circ$$

$$\text{For end:} \quad P = N + \phi$$

it being assumed that, in each case, the value of  $\phi$  is taken between the limits  $\pm 90^\circ$ .

*Computation of the annular eclipse of March 16, 1885, for Fort Bidwell, California:—*

$$\text{Latitude, } \phi = + 41^\circ 52'$$

$$\text{Longitude, } \lambda = + 120^\circ 6' \text{ from Greenwich.}$$

Constants for the given place:—

$$\log \rho \cos \phi' = 9.87263$$

$$\log \rho \sin \phi' = 9.82212$$

From the table on page 415, we find for the approximate times of the phases as follows:—

Beginning	.	.	<sup>h</sup> 3 <sup>m</sup> 50	} Greenwich Mean Time.
Annulus	.	.	5 15	
Ending	.	.	6 35	

	Beginning.	Annulus.	Ending.
Greenwich Mean Time	<sup>h</sup> 3 <sup>m</sup> 50	<sup>h</sup> 5 <sup>m</sup> 15	<sup>h</sup> 6 <sup>m</sup> 35
$\mu$	55° 20' 18"	76° 35' 36"	96° 35' 54"
$\mu - \lambda$	295 14 18	316 29 36	336 29 54
$\rho \cos \varphi'$	9.87263	9.87263	9.87263
$\sin (\mu - \lambda)$	9.95643 n	9.83786 n	9.60073 n
$\log \xi$	9.82906 n	9.71049 n	9.47336 n
$\xi$	— 0.67460	— 0.51343	— 0.29741

	Beginning.	Annulus.	Ending.
$\rho \sin \varphi'$	9.82212	9.82212	9.82212
$\cos d$	9.99985	9.99986	9.99986
$\log \rho \sin \varphi' \cos d$	9.82197	9.82198	9.82198
(1) $\rho \sin \varphi' \cos d$ +	0.66370	+ 0.66370	+ 0.66370
$\rho \cos \varphi'$	9.87263	9.87263	9.87263
$\sin d$	8.41619 <i>n</i>	8.40953 <i>n</i>	8.40315 <i>n</i>
$\cos (\mu - \lambda)$	9.62980	9.86052	9.96240
$\log \rho \cos \varphi' \sin d \cos (\mu - \lambda)$	7.91862 <i>n</i>	8.14268 <i>n</i>	8.23818 <i>n</i>
$\rho \cos \varphi' \sin d \cos (\mu - \lambda)$ -	0.00829	- 0.01389	- 0.01730
(1)-(2) $\eta$ +	0.67199	+ 0.67759	+ 0.68100
$\rho \cos \varphi'$	9.82212	9.82212	9.82212
$\sin d$	8.41619 <i>n</i>	8.40953 <i>n</i>	8.40315 <i>n</i>
$\log \rho \sin \varphi' \sin d$	8.23831 <i>n</i>	8.23165 <i>n</i>	8.22527 <i>n</i>
(1) $\rho \sin \varphi' \sin d$ -	0.01731	- 0.01704	- 0.01680
$\rho \cos \varphi' \cos (\mu - \lambda)$	9.50243	9.73315	9.83503
$\cos d$	9.99985	9.99986	9.99986
$\log \rho \cos \varphi' \cos d \cos (\mu - \lambda)$	9.50228	9.73301	9.83489
(2) $\rho \cos \varphi' \cos d \cos (\mu - \lambda)$ +	0.31790	+ 0.54077	+ 0.68373
(1)+(2) $\zeta$ +	0.30059	+ 0.52373	+ 0.66693
$\rho \cos \varphi' \cos (\mu - \lambda)$	9.50243	9.73315	9.83503
$\log \mu' (\text{constant})$	7.63983	7.63983	7.63983
$\log \xi'$	7.14226	7.37298	7.47486
$\xi'$ +	0.001387	+ 0.002360	+ 0.002984
$\log \xi$	9.82906 <i>n</i>	9.71049 <i>n</i>	9.47336 <i>n</i>
$\sin d$	8.41619 <i>n</i>	8.40953 <i>n</i>	8.40315 <i>n</i>
$\log \mu' (\text{constant})$	7.63983	7.63983	7.63983
$\log \eta'$	5.88508	5.75985	5.51634
$\eta'$ +	0.0000767	+ 0.0000575	+ 0.0000328
$x$ -	1.23432	- 0.50778	+ 0.17619
$x - \xi$ -	0.55972	+ 0.00565	+ 0.47360
$y$ +	0.44799	+ 0.68031	+ 0.89895
$y - \eta$ -	0.22400	+ 0.00272	+ 0.21795
$x'$ +	0.008546	+ 0.008549	+ 0.008550
$x' - \xi'$ +	0.007159	+ 0.006189	+ 0.005566
$y'$ +	0.002734	+ 0.002734	+ 0.002733
$y' - \eta'$ +	0.002658	+ 0.002677	+ 0.002700
$l$	0.55123	. . .	.55094
$l'$	. . .	.00522	. . .
$\log \tan f$	7.66576	. . .	7.66578
$\log \tan f$	. . .	7.66365	. . .
$\log \zeta$	9.47797	9.71910	9.82408
$\log \zeta \tan f$	7.14373	7.38275	7.48986
$\zeta \tan f$	0.00139	0.00241	0.00309
$L = l - \zeta \tan f$	0.54984	0.00281	0.54785
$\log (x - \xi)$	9.74797 <i>n</i>	7.75205	9.67541
$\log (y - \eta)$	9.35025 <i>n</i>	7.43457	9.33836
$\tan M$	0.39772	0.31748	0.33705



	Beginning.	Annulus.	Ending.
$M$	248° 11' 20"	64° 17' 36"	65° 17' 16"
$\cos M$	9.57001 $n$	9.63726	9.62124
$\log m$	9.78024	7.79731	9.71712
$\log (x' - \xi')$	7.85485	7.79162	7.74554
$\log (y' - \gamma')$	7.42455	7.42765	7.43136
$\tan N$	0.43030	0.36397	0.31418
$N$	69° 37' 52"	66° 30' 33"	64° 38' 13"
$\cos N$	9.54166	9.59879	9.63180
$\log n$	7.88289	7.82886	7.79956
$M - N$	178° 33' 28"	— 2° 18' 57"	0° 39' 3"
$\sin (M - N)$	8.40087	8.60646 $n$	8.05534
$\log m$	9.78024	9.79731	9.71712
$\csc L$	0.25977	2.55129	0.26135
$\sin \phi$	8.44088	8.95506 $n$	8.03381
$\phi$	178° 25' 7"	— 5° 10' 24"	0° 37' 10"
$\log L$	9.74023	. . .	9.73865
$\log L$	. . .	7.44871	. . .
$\cos \phi$	9.99983	9.99823	9.99997
$\csc n$	2.11711	2.17114	2.20044
	1.85717	9.61808	1.93906
$\frac{L \cos \phi}{n}$	$\pm$ 71.973	$\pm$ 0.415	$\pm$ 86.910
$\cos (M - N)$	9.99986 $n$	9.99964	9.99997
$\log \frac{m}{n}$	1.89735	9.96845	1.91756
	1.89721 $n$	9.96809	1.91753
$-\frac{m}{n} \cos (M - N)$	$\mp$ 78.924	— 0.92917	— 82.704
$\tau_1$	+ 6.951 $m$	— 1.344 $m$	+ 4.206 $m$
$\tau_2$	+ 150.897	— 0.514	— 169.614
$T$	$\begin{smallmatrix} h & m \\ 3 & 50 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 5 & 15 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 6 & 35 \end{smallmatrix}$
Approximate time,	$\begin{smallmatrix} h & m & s \\ 3 & 56 & 57 \end{smallmatrix}$	. .	$\begin{smallmatrix} h & m & s \\ 6 & 39 & 12 \end{smallmatrix}$
	Beginning.		Ending.
Annulus begins	. . . .	$\begin{smallmatrix} h & m & s \\ 5 & 13 & 39.3 \end{smallmatrix}$	. . . .
Annulus ends	. . . .	$\begin{smallmatrix} h & m & s \\ 5 & 14 & 29.2 \end{smallmatrix}$	. . . .
Duration of annulus	. . . .	49.9	. . . .

The small corrections to these times of beginning and ending are computed as follows:—

*Small correction for beginning.*

The result from the computation for the end  $\begin{smallmatrix} h & m \\ 3 & 45.4 \end{smallmatrix}$

The result from the computation for the beginning  $\begin{smallmatrix} h & m \\ 3 & 56.9 \end{smallmatrix}$

Difference  $t_2 - t_1 = 11.5$

$$\left(\frac{\tau_2}{\tau_1}\right)^2 = 595.6 \text{ and } \frac{\sin(\mu_1 - \lambda)}{\sin(\mu_2 - \lambda)} = \frac{\sin 44^\circ}{\sin 65^\circ} = .76$$

$$595.6 \times .76 = 452 = \frac{\text{error of } t_2}{\text{error of } t_1}, \text{ hence error of } t_1 = \frac{t_2 - t_1}{451} = 0.025$$

*Small correction for end.*

The result from the computation for the beginning	<sup>h</sup> 3 <sup>m</sup> 20.89
The result from the computation for the end	6 39.20
Difference $t_1 - t_2 =$	18.31

$$\left(\frac{r_2}{r_1}\right)^3 = 1290 \text{ and } \frac{\sin(\mu_1 - \lambda)}{\sin(\mu_2 - \lambda)} = \frac{\sin 44^\circ}{\sin 23^\circ} = 1.778$$

$$1290 \times 1.778 = 2292 = \frac{\text{error of } t_2}{\text{error of } t_1}, \text{ hence error of } t_2 = \frac{t_1 - t_2}{2291} = .008$$

Therefore the concluded times of the phases are as follows:—

Beginning of eclipse	<sup>h</sup> 3 <sup>m</sup> 56 <sup>s</sup> 58.2	} Greenwich Mean Time.
Beginning of annulus	5 13 39.3	
End of annulus	5 14 29.2	
End of eclipse	6 39 12.8	

Angle of position:

	Beginning.	End.
<i>N</i>	69° 38'	64° 38'
<i>ψ</i>	178 25	37
<i>P</i>	248 3	65 15

*Elements of Occultations.*—Pages 419—443 give the elements for the prediction of the times of occultation of stars and planets by the moon. In the columns referring to the star, those headed *Red'ns from 1885.0* give the quantities necessary to reduce the mean place of the star at the beginning of 1885 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

The quantities in the following five columns are all given for the moment of geocentric conjunction of the star and moon in right ascension. Let there be a line passing from the star through the centre of the moon, and let a plane perpendicular to this line pass through the centre of the earth: this plane will be the fundamental plane for the occultation. The system of co-ordinates is similar to that already described for eclipses. The cone circumscribing the moon and star may be regarded as a cylinder having everywhere the same diameter as the moon. This cylinder will intercept the fundamental plane in a circle of which the linear diameter will be the same as that of the moon.

The *Washington Mean Time* is the moment at which the two bodies are in geocentric conjunction in right ascension. At this moment the co-ordinate  $x$  of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour-Angle H* gives the common geocentric hour-angle of the moon and star at the same moment, counted from the meridian of Washington—positive toward the west and negative toward the east. Column *Y* gives the co-ordinate  $y$  of the axis of the cylinder upon the fundamental plane at the same moment. Columns  $x'$  and  $y'$  give the hourly variation of  $x$  and  $y$ . The linear unit in these columns is the earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star behind the limb of the moon may be computed for any part of the earth by a method nearly the same as that already explained for computing eclipses, only more simple.

We shall first show how to compute an isolated occultation for a particular place, assuming it to be visible at that place, and then show how all the occultations which will be visible at a place may be selected and computed by a more rapid process.

(1) The geocentric co-ordinates of the place,  $\rho \sin \varphi'$  and  $\rho \cos \varphi'$ , are to be computed with three or four places of decimals by the formulæ,

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

$$\rho \cos \varphi' = F \cos \varphi$$

already given in connection with the eclipses.

As in the case of eclipses, it is necessary to have an approximate time of the phenomenon, corresponding to that obtained from the charts of the eclipses. The quantity  $H$  being the Washington west hour-angle of the two bodies at the moment of geocentric conjunction,  $H - \lambda$  will be the local hour-angle of the star at this same moment. Let us call this angle  $h_0$ , putting

$$h_0 = H - \lambda$$

The next step will then be to find the approximate moment of apparent conjunction in right ascension as seen from the place. An approximate correction to reduce the time and hour-angle for geocentric conjunction to those for apparent conjunction may be taken from Mr. DOWNES'S table, on pages 444—445. This correction will have the same sign as  $h_0$ .

When this table is not available, the correction may be computed thus: Compute the quantities  $\xi_0$ ,  $\xi'$ , and  $\tau$  from the formulæ,

$$\xi_0 = \rho \cos \varphi' \sin h_0$$

$$\xi' = [9.4192] \cos (h_0 + \frac{1}{3} h_0)$$

$$\tau = \frac{\xi_0}{x' - \xi'}$$

$\tau$  will then be the approximate interval between the times of geocentric and local conjunction. By applying it to the Washington mean time of the former, as given with the elements, we shall have the Washington mean time of the latter within a few minutes.

The average duration of an occultation is about an hour. Thence, by adding  $0^h.5$  to and subtracting it from the mean time of apparent conjunction, we shall have rough times of the phases of immersion and emersion for farther computation. Let us then put,

$$\tau_1 = \tau - 0^h.5$$

$$\tau_2 = \tau + 0^h.5$$

$T$ , the Washington mean time of geocentric conjunction in R. A.

$d$ , the declination of the star.

(2) Compute for the moments  $T + \tau_1$  and  $T + \tau_2$  the following quantities, in which we write  $\tau$  for each of the quantities  $\tau_1$  and  $\tau_2$ . The latter, when used as angles, are to be changed to arc by multiplying by  $15^\circ$ , and the minutes are to be further increased by one-sixth the number of degrees in order to reduce to the sidereal hour-angle.

$$\xi = \rho \cos \varphi' \sin (h_0 + \tau)$$

$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (h_0 + \tau)$$

$$\xi' = [9.4192] \rho \cos \varphi' \cos (h_0 + \tau)$$

$$\eta' = [9.4192] \rho \cos \varphi' \sin d \sin (h_0 + \tau) = [9.4192] \xi \sin d$$

$$x = x' \tau$$

$$y = Y + y' \tau$$

Compute  $m$ ,  $M$ ,  $n$  and  $N$  from the equations

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

$$n' = \frac{n}{60} = [8.2218] n$$

$$\sin \phi = [0.5650] n \sin (M - N)$$

Then,  $t_1$  and  $t_2$  from the equations

$$t_1 = -\frac{m}{n'} \cos (M - N) - \frac{[9.4350]}{n'} \cos \phi \quad (\text{Beginning.})$$

$$t_2 = -\frac{m}{n'} \cos (M - N) + \frac{[9.4350]}{n'} \cos \phi \quad (\text{End.})$$

The quantities  $t_1$  and  $t_2$  will then be the corrections in minutes to be applied to the respective times  $T + \tau_1$  and  $T + \tau_2$  to obtain the Washington mean times of the phases.

As in the case of eclipses, the small value of  $t_1$  will give an accurate result for one phase, and the large value an inaccurate result for the other. Both accurate results may then be corrected by comparison with the inaccurate one, in the way described for eclipses, and a result obtained which will probably be correct within a fraction of a minute of time.

As a check upon the result, it will be advisable to compute  $\xi$ ,  $\eta$ ,  $x$  and  $y$  for the moments finally obtained. If the times are correct these quantities will fulfil the condition,

$$\sqrt{(x - \xi)^2 + (y - \eta)^2} = 0.2723$$

If  $\log m \sin (M - N) = 9.4350$  nearly, a recalculation will generally be necessary to determine whether, numerically,  $\sin \phi < 1$ , or  $\sin \phi > 1$ . In the latter case, the impossible value of  $\sin \phi$  indicates that an occultation at the given place is impossible, unless the computed distance from the moon's limb is within the errors of the ephemerides of the moon and star.

In such cases of near approach to the moon's limb, we may take  $\phi = 90^\circ$ , or  $270^\circ$ , according as  $\sin (M - N)$  is positive or negative; and for finding the time of nearest approach,

$$t = -\frac{m \cos (M - N)}{n'}$$

Putting  $\pi$  for the moon's horizontal parallax, the distance from the moon's limb will be,

$$\pi [m \sin (M - N) - 0.2723]$$

disregarding the sign of  $\sin (M - N)$ ; or, allowing for the augmentation of the semidiameter,

$$\pi [m \sin (M - N) - 0.2723] [1 + z \sin \pi]$$

where

$$z = \rho \cos \varphi' \cos d \cos (h_0 + \tau) + \rho \sin \varphi' \sin d$$

The position-angle,  $P$ , of the line from the moon's centre to the star at the times of contact, reckoned from the north point toward the east, is given by the formulæ:—

$$\begin{aligned} P &= N - \phi && \text{for immersion,} \\ P &= N + \phi \pm 180^\circ && \text{for emersion,} \end{aligned}$$

it being supposed that the value of  $\phi$ , in each case, is taken between the limits  $\pm 90^\circ$ .

To find the angle from the vertex, we compute the angle  $C$  from the formula,

$$\tan C = \frac{\xi + t \xi'}{\eta + t \eta'}$$

in which the value of  $t$  corresponding to the phase is to be used. Then

$$V = P - C$$

is the angle from the vertex, also reckoned from the north toward the east.

As an example of an isolated occultation, we shall compute that of  $\lambda$  Geminorum on 1885, January 28, for Cambridge, Massachusetts, of which the position is—

$$\begin{aligned} \varphi &= + 42^\circ 22'.8 \\ \lambda &= - 0^h 23^m 41^s.1 \quad \text{from Washington.} \end{aligned}$$

From (1) of eclipses we find,

$$\log \rho \sin \varphi' = 9.8264$$

$$\log \rho \cos \varphi' = 9.8691$$

From the table of elements, page 420 . . . . .  $H = - 1^h 47^m.2$

Hence, . . . . .  $h_0 = H - \lambda = - 1^h 23^m.5$

From the table we find the correction to apparent conjunction to be  $-37^m$ . Adding this to the time of apparent conjunction, and then subtracting and adding half an hour, we have for the approximate Washington times to be used in the computations,

Immersion,  $\tau_1 = -67^m = -1^h.116$ ;  $T = \text{January } 28, 7^h 43^m.3$

Emersion,  $\tau_2 = -7^m = -0^h.116$ ;  $T = \text{January } 28, 8^h 43^m.3$

	Immersion.	Emersion.
	$h \quad m$	$h \quad m$
$h_0$	— 1 23.5	— 1 23.5
$\tau$ , reduced to sidereal time	— 1 7.2	— 7.0
$h_0 + \tau$	— 2 30.7	— 1 30.5
$h_0 + \tau$ (in arc)	— $37^\circ 40'.5$	— $22^\circ 37'.5$
$\sin d$	+ 9.4596	9.4596
$\cos d$	+ 9.9812	9.9812
$\sin (h_0 + \tau)$	9.7862 <i>n</i>	9.5851 <i>n</i>
$\rho \cos \varphi' \sin d$	9.3287	9.3287
$\cos (h_0 + \tau)$	9.8984	9.9652
$\log \xi$	9.6553 <i>n</i>	9.4542 <i>n</i>
$\log \rho \cos \varphi' \sin d \cos (h_0 + \tau)$	9.2271	9.2939
$\log \rho \sin \varphi' \cos d$	9.8076	9.8076
$\log \rho \cos \varphi' \cos (h_0 + \tau)$	9.7675	9.8343
$\log \rho \sin \varphi' \sin d$	9.2860	9.2860
$\log \xi' = [9.4192] \rho \cos \varphi' \cos (h_0 + \tau)$	9.1867	9.2535
$\log \eta' = [9.4192] \rho \cos \varphi' \sin d \sin (h_0 + \tau)$	8.5341 <i>n</i>	8.3330 <i>n</i>
$\rho \sin \varphi' \cos d$	+ 0.6421	+ 0.6421
$-\rho \cos \varphi' \sin d \cos (h_0 + \tau)$	— 0.1687	— 0.1967
$\eta$	+ 0.4734	+ 0.4454
$x = x' \tau$	— 0.6838	— 0.0711
$\xi$	— 0.4522	— 0.2846
$x - \xi$	— 0.2316	+ 0.2135
$y = Y + y' \tau$	+ 0.7262	+ 0.6607
$\eta$	+ 0.4734	+ 0.4454
$y - \eta$	+ 0.2528	+ 0.2153
$x'$	+ 0.6127	+ 0.6127
$\xi'$	+ 0.1537	+ 0.1793
$x' - \xi'$	+ 0.4590	+ 0.4334
$y'$	— 0.0655	— 0.0655
$\eta'$	— 0.0342	— 0.0215
$y' - \eta'$	— 0.0313	— 0.0440
$\log m \sin M$	9.3647 <i>n</i>	9.3294 <i>n</i>
$\log m \cos M$	9.4028	9.3330
$\log \tan M$	9.9619 <i>n</i>	9.9964 <i>n</i>
$\log n \sin N$	9.6618	9.6369
$\log n \cos N$	8.4955 <i>n</i>	8.6435 <i>n</i>
$\log \tan N$	1.1663 <i>n</i>	0.9934 <i>n</i>
$M$	$317^\circ 30'.7$	$44^\circ 45'.8$
$N$	$93^\circ 54.0$	$95^\circ 47.9$
$M - N$	$223^\circ 36.7$	$308^\circ 57.9$

	Immersion.	Emerison.
$\log \sin (M - N)$	9.8387 $n$	9.8907 $n$
$\log m$	9.5351	9.4817
$\log n$	9.6628	9.6457
$\log n'$	7.8646	7.8675
$\log \sin \phi$	9.9388 $n$	9.9374 $n$
$\log \cos (M - N)$	9.8598 $n$	9.7985
$\log \frac{m}{n'}$	1.6505	1.6142
$\log \cos \phi$	9.6951	9.6994
$[9.4350] \div n'$	1.5504	1.5675
$-\frac{m}{n'} \cos (M - N)$	+ 32.4	- 25.9
$\frac{[9.4350]}{n'} \cos \phi$	$\pm$ 17.6	$\pm$ 18.5
$t_1$	+ 14.8	- 7.4
$t_2$ (inaccurate)	+ 50.0	- 44.4
Washington conjunction + $\tau$	$\begin{smallmatrix} h & m \\ 7 & 43.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 8 & 43.3 \end{smallmatrix}$
Washington mean time of phase	7 58.1	8 35.9
- $\lambda$	+ 23.7	+ 23.7
Cambridge mean time of phase	8 21.8	8 59.6

These times may now be corrected in the way described for the eclipses, but for the purposes of prediction, this correction need be executed only for the emersion.

For the position-angles from the north point of the moon's limb toward the east, we have—

	Immersion.	Emerison.
$N$	93° 54'	95° 46'
$\phi$	- 60 17	300 02
	$\frac{. . .}{. . .}$	180
$P =$	154 11	215 50

*Prediction of Many Occultations for a Given Place.*—When it is desired to predict all the occultations which will be visible at some one place, tables may be constructed and applied in such a way as to greatly diminish the labor of computation. In using such tables, the most convenient course will be to find for each occultation the hour-angle of the star at the moment of apparent conjunction in right ascension, as seen from the place of observation. The table of elements, pages 419—443, gives  $H$ , the Washington hour-angle at the moment of geocentric conjunction. The corresponding geocentric hour-angle at the place will be—

$$h_0 = H - \lambda \quad (\lambda = \text{west longitude from Washington}).$$

The moment of apparent conjunction, as seen from the station, will be given by the condition  $\xi = x$ ; or, using the values of  $\xi$  and  $x$ ,

$$\rho \cos \phi' \sin h = x' \tau$$

$h$  being the west hour-angle of the star at the moment in question, and  $\tau$  the interval, in hours of mean time, which has elapsed since geocentric conjunction. We shall therefore have,

$$h = h_0 + \tau$$

for the hour-angle at the end of the interval  $\tau$  after geocentric conjunction. In strictness,  $\tau$  should here be multiplied by the factor  $1 + \frac{1}{365.25}$ , because the star moves a little more than  $15''$  in an hour of mean time; but the error arising from the neglect of the factor is too small to be important, as it will affect the predicted time of conjunction by less than 10 seconds. The equation for finding  $\tau$  is therefore,

$$\rho \cos \phi' \sin (h_0 + \tau) = x' \tau$$

The quantities  $h_0$  and  $x'$  being derived immediately from the data of the Ephemeris, the quantity  $\tau$  is readily obtained by successive approximation, and may be tabulated as a function of  $h_0$  and  $x'$ . The computation of  $\tau$  is effected as follows: We have

$$\sin(h_0 + \tau) = \sin h_0 + 2 \sin \frac{1}{2} \tau \cos(h_0 + \frac{1}{2} \tau) \quad (1)$$

The value of  $\tau$  in arc being seldom more than  $24^\circ$  we have put  $\tau$  itself for  $2 \sin \frac{1}{2} \tau$ . The equation will then become

$$\rho \cos \varphi' \sin h_0 + \tau \rho \cos \varphi' \cos(h_0 + \frac{1}{2} \tau) = x' \tau$$

from which we find

$$\tau = \frac{\rho \cos \varphi' \sin h_0}{x' - k \rho \cos \varphi' \cos(h_0 + \frac{1}{2} \tau)} \quad (2)$$

To tabulate  $\tau$ , we must first have a table of the quantities

$$\begin{aligned} \xi &= \rho \cos \varphi' \sin h \\ \xi' &= [9.41916] \rho \cos \varphi' \cos h \end{aligned} \quad (3)$$

which table may be formed for every 10 minutes (in time) of  $h$ . If we then put  $\xi_0$  for the value of  $\xi$  corresponding to  $h = h_0$ , and  $\xi'_1$  for the value of  $\xi'$  corresponding to  $h = h_0 + \frac{1}{2} \tau$ , we shall have

$$\tau = \frac{\xi_0}{x' - \xi'_1} \quad (4)$$

Since we must know the value of  $\tau$ , approximately, before we can take  $\xi'_1$  from the table, this equation can be solved only by successive approximations. The approximations converge so rapidly as to offer no difficulty. It will be best to begin by computing values of  $\tau$  for the two extremes of  $x'$ , namely,  $x' = 0.48$  and  $x' = 0.60$ , because the approximate values of  $\tau$  can then be interpolated for all intermediate values of  $x'$ . For the first approximation may be taken—

$$\begin{aligned} \frac{1}{2} \tau &= 50^m \sin \frac{4}{3} h_0 \quad (\text{for } x' = 0.48) \\ \frac{1}{2} \tau &= 40^m \sin \frac{4}{3} h_0 \quad (\text{for } x' = 0.60) \end{aligned} \quad (5)$$

or, the approximate values of  $\tau$  may be taken from Mr. DOWNES's table, pages 444—445. It will be best to make the computation for every  $30^m$  of  $h_0$ , and to find the intermediate values of  $\tau$  for every  $10^m$  by interpolation. Then for each  $30^m$  of  $h_0$  we take  $\xi'$  from a table with the argument  $h_0 + \frac{1}{2} \tau$ , and  $\log \xi$  with the argument  $h_0$ , and thence compute  $\tau$  by (4). If the value of  $\tau$  thus arrived at differs more than  $3^m$  from that employed in taking out  $\xi'$ , a new value may be used to correct  $\xi'$ , and the computation may be repeated. The values corresponding to  $x' = 0.51$ ,  $x' = 0.54$ , and  $x' = 0.57$ , can then be computed with the single interpolation of approximate values of  $\tau$ , and afterward the table can be extended by interpolation to every 0.01 of  $x'$  between  $x' = 0.48$  and  $x' = 0.62$ . It will be best to compute  $\tau$  in the first place to every 0.001 of an hour, and to drop the last figure in forming the definitive table. We shall call the table thus formed *Table I*.

The values of  $\eta$  and of  $\eta'$  may then be tabulated for every degree of the star's declination, and every  $10^m$  of  $h$ . It will not be really necessary to compute the table for negative values of  $d$ , since by putting

$$\begin{aligned} \eta_1 &= \rho \sin \varphi' \cos d \\ \eta_2 &= -\rho \cos \varphi' \sin d \cos h \end{aligned}$$

$\eta_1$  may be given in a table of single-entry; and taking  $\eta_2$  from the table of double-entry for a positive  $d$ , we shall have

$$\eta = \eta_1 \pm \eta_2$$

the lower sign being used for a negative  $d$ . But the extension of the table for  $\eta$  to negative values of  $d$  is so readily made that it will probably be found better to do it, so as to save taking out  $\eta_1$  and  $\eta_2$  separately.

We shall call this table for  $\eta$  *Table II*, and the corresponding one for  $\eta'$  with the same arguments *Table III*. The precepts for using the tables will then be as follow:—

From *Table I* with the arguments  $x'$  and  $H - \lambda = h_0$ , take out the value of  $\tau$ . It will be sufficient to use the nearest 0.01 of  $x'$ .  $\tau$  will be of the same sign as  $h_0$ . Then, enter *Table II* with the arguments  $d$  (the star's declination) and  $h = h_0 + \tau$ , and take out the value of  $\eta$ . Form the quantities  $y = Y + y' \tau$ , and  $y - \eta$ . If the latter quantity lies between the limits  $\pm 0.28$ , it is almost certain that there will be an occultation. If it falls without the limits  $\pm 0.33$ , it is almost certain that there will not be an occultation. Between the years 1881 and 1890 these last limits may be reduced to  $\pm 0.32$ , and cases near this limit may be rejected if  $y'$  is small. A convenient rule to adopt will be—

$$\begin{array}{ll} y' < 0.10, & \text{limits} = \pm 0.29 \\ 10 < y' < 0.15, & \text{limits} = \pm 0.30 \\ 15 < y' < 0.20, & \text{limits} = \pm 0.31 \\ 20 < y' & \text{limits} = \pm 0.33 \text{ or } \pm 0.32 \end{array}$$

Here, only the absolute value of  $y'$  is to be considered, without respect to its algebraic sign.

If  $y - \eta$  falls between the limits thus indicated, take the values of  $\xi'$  and  $\eta'$  from their appropriate tables and compute  $v$ ,  $Q$  and  $\Delta$  from the equations

$$\begin{aligned} v \sin Q &= y' - \eta' \\ v \cos Q &= x' - \xi' \\ \Delta &= (y - \eta) \cos Q \end{aligned}$$

If  $\Delta > 0.2723$  or  $\log \Delta > 9.4350$  there will be no occultation, or, at best, the moon will only graze the star when  $\Delta = 0.2723$  is very small. If  $\Delta < 0.2723$ , compute

$$\begin{aligned} \tau_1 &= -\frac{y - \eta}{v} \sin Q & \cos P &= \frac{\Delta}{0.2723} \quad (P < 180^\circ) \\ \tau_2 &= \frac{0.2723 \sin P}{v} \end{aligned}$$

We shall then have—

Local mean time of immersion,  $T - \lambda + \tau + \tau_1 - \tau_2$

Local mean time of emersion,  $T - \lambda + \tau + \tau_1 + \tau_2$

Position-angle from north toward east at immersion,  $180^\circ - Q - P$

Position-angle from north toward east at emersion,  $180^\circ - Q + P$

In predicting the occultations for a given place, the first operation will be to go over the list of occultations in the Ephemeris, and select those which may be visible. The conditions of possible visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.
2. The quantity  $H - \lambda$ , taken without regard to sign, must be less than the semi-diurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east horizon, or an immersion in the west, when this difference is a few minutes less than an hour.
3. The sun must not be much more than an hour above the horizon at the local mean time  $T - \lambda$ , unless the star is bright enough to be seen in the day time.

The most convenient course will be to write the value of  $-\lambda$  on the bottom of a sheet of paper, and, passing through the list of occultations, pause over each one for which condition (1) is fulfilled, and examine whether conditions (2) and (3) are fulfilled. If either fails, the computer passes on. Very often it will require some examination to find whether  $H - \lambda$  or  $T - \lambda$  falls within the limits: in these cases, the computer may mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.



*Phenomena of Planets and Satellites*, pages 450—481.—These are, for the most part, sufficiently explained in the body of the work. The following additional explanations are added for completeness.

*Disks of Mercury and Venus*, pages 450—451.—The angle  $\theta$ , needed in reducing meridian-observations, is the angle which the arc of great circle from the planet to the sun makes with the arc from the planet toward the west, reckoned in the direction west, north, east, south. This position-angle is reckoned from  $0^\circ$  to  $360^\circ$ , as in the measurement of double stars, the planet taking the place of the central star. But its measure is  $90^\circ$  greater than that of a double star.

We may also regard  $\theta$  as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the centre of the planet upon his right.

*Satellites of Jupiter*, pages 453—475.—The times of phenomena are explained at the foot of each page; the diagrams, on page 453.

*Phenomena*, pages 482 and 483.—The conjunctions, quadratures, and oppositions of the planets with respect to the sun give the hours when the longitude of each planet differs from that of the sun by  $0^\circ$ ,  $90^\circ$ , or  $180^\circ$ .

The conjunctions of the moon and planets with each other are given in right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

*Latitude by Observed Altitude of Polaris*.—Table IV replaces the Tables A, B, C, D, given as a *Supplement* to the volumes of the Ephemeris for 1874—1881, and is intended for use at sea and reconnaissance on land. It will furnish an approximate value of the latitude, the probable error of which, in so far as the table is concerned, will be a few tenths of a minute of arc.



## APPENDIX.

### ON THE CONSTRUCTION OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC FOR 1885.

THE adopted constants of precession, nutation, and aberration are those of STRUVE and PETERS, namely:—

$$\text{Precession} = 50''.2411 + 0''.0002268 t$$

$$\text{Nutation} = 9''.2231 + 0''.000009 t$$

$$\text{Aberration} = 20''.4451$$

in which  $t$  is the number of years after 1800.0.

The obliquity of the ecliptic is that of HANSEN's *Tables du Soleil*, which is  $0''.32$  greater than that of PETERS, given in the issues of this Ephemeris preceding that for 1882. A comparison of HANSEN's mean obliquity with that of PETERS and of LE VERRIER at different epochs is given in the following table:—

Epoch.	HANSEN.	PETERS.	LE VERRIER.	H.—P.	H.—L.
	<sup>°</sup> 23 28 18.19	<sup>°</sup> 17.44	<sup>°</sup> 19.42	<sup>°</sup> + 0.75	<sup>°</sup> — 1.23
1750	23 28 18.19	17.44	19.42	+ 0.75	— 1.23
1800	23 27 54.80	54.22	55.63	+ 0.58	— 0.83
1850	23 27 31.42	30.99	31.83	+ 0.43	— 0.41
1900	23 27 8.02	7.76	8.03	+ 0.26	— 0.01

The formulæ for reducing the places of the fixed stars, page 280, correspond to the *Star-Tables of the American Ephemeris*, Washington, 1869.

The mean right ascensions of stars have been reduced to NEWCOMB's fundamental standard, in the catalogue attached to the *Washington Observations for 1870*, Appendix II, with the following exceptions: The right ascensions of the 48 circumpolar stars north of  $60^\circ$  north declination are from Dr. GOULD's *Standard Places of Fundamental Stars*, second edition, United States Coast Survey Office, 1866. Of the twelve stars south of  $50^\circ$  south declination, the positions of  $\beta$  Hydri,  $\alpha$  Trianguli Australis, and  $\sigma$  Octantis, have been corrected from data furnished by Dr. GOULD; while the remaining nine are, as before, from the *British Nautical Almanac* for 1848.

The right ascensions of additional stars in the general list, for which no apparent places are given in the subsequent section, have been taken partly from the *Catalogue of 1098 Standard Clock and Zodiacal Stars*, forming Part IV of Vol. I of *Astronomical Papers Prepared for the Use of the American Ephemeris and Nautical Almanac*, Washington, 1881; and partly from the catalogue of the *Astronomische Gesellschaft* of 1878. A few have been derived from recent catalogues without a rigorous reduction for equinox.

The mean declinations of stars are taken from BOSS's paper in the *Report of the Northern Boundary Commission*, Washington, 1879, for all stars found therein. The declinations of all the other stars have been reduced to the same standard, except those of the additional ones above, which have been taken partly from the *Astronomische Gesellschaft* list, and partly from places in recent catalogues. To the apparent places of Sirius and Procyon have been applied the periodic corrections resulting from AUWERS's investigations.

The values of these corrections are:—

Year.	Sirius.		Procyon.	
1885.0	$\Delta \alpha = -0.001$	$\Delta \delta = -1.33$	$\Delta \alpha = -0.006$	$\Delta \delta = +1.05$
1886.0	$\Delta \alpha = +0.019$	$\Delta \delta = -1.25$	$\Delta \alpha = +0.005$	$\Delta \delta = +1.05$

The mean places of the stars are all identical with those found in Vol. I, Part IV of *Astronomical Papers Prepared for the Use of the American Ephemeris and Nautical Almanac*, Washington, 1881.

The ephemeris of the sun is constructed from HANSEN and OLUFSEN's *Tables du Soleil*, Copenhagen, 1853, except that STRUVE's aberration has been used. This is equivalent to adding  $0''.19$  to the true longitudes, but it does not affect the right ascensions and declinations. The sun's rectangular equatorial co-ordinates have been computed from the longitudes and latitudes by the following formulæ:—

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3 R \beta \\ Z &= R \sin \lambda \sin \omega + 44.5 R \beta \end{aligned}$$

The reductions to mean equinox, 1885.0, are computed by the formulæ,

$$\begin{aligned} \Delta X' &= + Y \sec \omega \Delta \lambda \\ \Delta Y' &= - X \cos \omega \Delta \lambda + \Delta \omega - 9.4 \tau R \sin (\odot + 187^\circ) \\ \Delta Z' &= - X \sin \omega \Delta \lambda - Y \Delta \omega + 21.7 \tau R \sin (\odot + 187^\circ) \end{aligned}$$

Wherein—

- $\lambda$  &  $\beta$  are the longitude and latitude of the sun referred to the equinox and ecliptic of the date;
- $\omega$ , the obliquity of the ecliptic;
- $\Delta \lambda$ , the reduction of longitude for precession and nutation from January 0;
- $\Delta \omega$ , the reduction of the mean to the apparent obliquity;
- $\tau$ , the fraction of the year since January 0.

The numerical coefficients are in units of the seventh place of decimals. The correction for latitude has been taken from GOETZE's paper in the *Astronomical Journal*, Vol. II, page 71.

The mean equatorial horizontal parallax of the sun, adopted from Professor NEWCOMB's *Investigation of the Distance of the Sun and the Elements which depend on it*,\* is  $8''.848$ . The adopted semidiameter of the sun at the earth's mean distance is  $16' 2''$ . In the computations pertaining to eclipses, RESSEL's semidiameter,  $15' 59''.788$  has been used.

The right ascension, declination, and parallax of the moon are derived from HANSEN's *Tables de la Lune*, London, 1857, the mean longitude being corrected in accordance with NEWCOMB's *Researches on the Motion of the Moon*, Part I, page 268,† and a corrected table being substituted for Table XXXIV.

The semidiameter of the moon is computed from the moon's horizontal parallax by the formula,  

$$S = 0.272274 \pi + 2''.5$$

The constant  $2''.5$  is omitted in the computation of eclipses and occultations, as due entirely to telescopic and ocular irradiation.

The ephemeris of Mercury is derived from Professor WINLOCK's *Tables of Mercury*, Washington, 1864. They are based on the older theory of LE VERRIER, published in the *Additions to the Connaissance des Temps* for 1848.

The ephemeris of Venus is derived from Mr. G. W. HILL's *Tables of Venus*, Washington, 1872.

The ephemeris of Mars is derived from manuscript tables constructed from LINDENAU's Tables. Mr. HUGH BREEN's results, contained in his paper *On the Corrections of LINDENAU's Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX, have also been discussed and applied; and LE VERRIER's secular variations of the elements are likewise adopted. The following are the corresponding corrected elements and annual variations for Washington, 1855.0:—

$$\begin{aligned} L &= 320^\circ 13' 33''.87 + 689101''.1527 \text{ } t \\ \pi &= 333^\circ 23' 17''.84 + 65.9990 \text{ } t \\ \Omega &= 48^\circ 25' 55''.29 + 27.6997 \text{ } t \\ i &= 1^\circ 51' 2.20 - 0.02141 \text{ } t \\ e &= 19238''.75 + 0.18549 \text{ } t \\ n &= 689050''.8927 \\ a &= 1.5236915 \end{aligned}$$

The ephemeris of Jupiter is derived from manuscript tables constructed from BOUVARD's Tables, with such changes as were required to make them correspond more nearly to the formulæ.

The ephemeris of Saturn is derived from a provisional theory constructed by Mr. GEORGE W. HILL, and still unpublished.

The ephemerides of Uranus and Neptune are derived from Professor NEWCOMB's Tables, published by the *Smithsonian Institution*.

\* *Astronomical Observations made at the U. S. Naval Observatory, Washington, 1865, Appendix II.*

† *Astronomical Observations made at the U. S. Naval Observatory, Washington, 1875, Appendix II.*

The semidiameters of the planets are computed from the following values:—

	Semidiameter.	Log Dist.	Authority.
Mercury	3.34 "	0.00	LE VERRIER, <i>Theory of Mercury</i> .
Venus	8.546 $\pm$ 0.086	0.00	PEIRCE, from the Washington Observations of 1845 and 1846, made with the Mural Circle.
Mars (polar)	2.842 $\pm$ 0.057	0.25	
Jupiter (polar)	18.78 $\pm$ 0.067	0.70	
Saturn (polar)	8.77 $\pm$ 0.039	0.95	
Uranus	1.68 $\pm$ 0.3	1.30	
Neptune	1.28	1.48	
Jupiter (equatorial)	20.00	0.70	
Saturn (equatorial)	9.38	0.95	

The elements of eclipses of the sun and occultations of stars by the moon are adapted to BESSEL's method, using the special forms in CHAUVENET's *Spherical and Practical Astronomy*. The adopted semidiameters are:—

Semidiameter of the sun at distance unity. . . . 959".788

Ratio of radius of moon to radius of earth . . . 0.27227

The eclipses of Jupiter's satellites are computed from TODD's *Continuation of DAMOISEAU's Tables*, Washington, 1876. The occultations, transits, etc., are computed from WOOLHOUSE's *Tables, British Nautical Almanac* for 1835, Table II of each satellite having been adapted to DAMOISEAU's Tables.

The elongations and conjunctions of the satellites of Saturn are computed from manuscript tables by Professor NEWCOMB.

The apparent elements of the rings of Saturn are computed from BESSEL's data, except those for the dusky ring.

The elongations of the satellites of Uranus, and of the satellite of Neptune are prepared from the data of Professor NEWCOMB's *Uranian and Neptunian Systems*, Washington, 1875.

In compiling the positions of observatories, the latest available data have been used. The positions have been furnished, in many instances, through the courtesy of the directors of the Observatories, in response to a circular issued by the Superintendent of the American Ephemeris.

The reduction to geocentric latitude, and the logarithm of the radius of the earth are derived from BESSEL's elements of the terrestrial spheroid, as adapted in Table III of CHAUVENET's *Spherical and Practical Astronomy*, Vol. II:—

$$\log e = 8.9122052$$

$$\varphi' - \varphi = -11' 30''.65 \sin 2\varphi + 1''.16 \sin 4\varphi$$

$$\log \rho = 9.9992747 + 0.0007271 \cos 2\varphi - 0.0000018 \cos 4\varphi$$

Table IV, for finding the latitude from an observed altitude of Polaris, is constructed for—

(1) An altitude of Polaris equal to 45°.

(2) A declination of Polaris equal to  $+88^{\circ} 41' 50''$ .

The directions for using the table are adapted to a right ascension of Polaris equal to  $1^{\text{h}} 17^{\text{m}}.2$ . Somewhat greater accuracy may be insured by substituting the right ascension of Polaris at the date of observation, from pages 302—313 of this volume.

The principal computations of the Ephemeris have been distributed in the following manner:—

The sun has been computed by Mr. EASTWOOD; the moon's longitude, latitude, semidiameter and horizontal parallax, by Professor KEITH; right ascension and declination, by Professor VAN VLECK; culminations, by Professor RUNKLE; lunar distances, by Mr. W. B. OLIVER; Mercury and Venus, by Mr. E. P. AUSTIN; Mars, Jupiter, Saturn, and Uranus, by Mr. ROBERDEAU BUCHANAN; Jupiter's satellites, by Mr. W. F. McK. RITTER; Neptune, by Mr. WIESSNER. The fixed stars have been prepared by Mr. WIESSNER and Mr. MEIER; the general constants for their reduction, by Mr. WIESSNER; the occultations, by Mr. DOWNES assisted by Mr. WIESSNER; and the eclipses have been computed and the charts projected by Mr. BUCHANAN.



# TABLE I.

CORRECTION REQUIRED, ON ACCOUNT OF SECOND DIFFERENCES OF THE MOON'S MOTION, IN FINDING THE GREENWICH TIME CORRESPONDING TO A CORRECTED LUNAR DISTANCE.

Approximate Interval.				DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																															
				2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52						
h	m	h	m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	10	2	50	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3		
0	20	2	40	0	0	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3		
0	30	2	30	0	1	1	2	2	2	2	3	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	9	9		
0	40	2	20	0	1	1	2	2	3	3	3	4	4	5	5	6	6	6	7	7	8	8	9	9	10	10	10	11	11	11	11	11	11		
0	50	2	10	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	12	13	13	13	13	13		
1	0	2	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	14	14	14	14	14	14		
1	10	1	50	1	1	2	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	14	14	15	15	15	15	15	15		
1	20	1	40	1	1	2	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	14	14	15	16	16	16	16	16	16		
1	30	1	30	1	1	2	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	14	14	15	16	16	16	16	16	16		
				DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																															
				64	66	68	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100								
h	m	h	m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
0	10	2	50	4	4	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	7			
0	20	2	40	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	11	11	11	11	12	12	12	12	12	12	12	12	12	12			
0	30	2	30	9	10	10	10	11	11	12	12	12	13	13	13	14	14	14	15	15	16	16	16	17	17	17	17	17	17	17	17	17			
0	40	2	20	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	19	19	19	20	20	21	21	21	22	22	22	22	22			
0	50	2	10	14	14	15	15	16	16	16	17	17	18	19	19	20	20	21	21	22	22	23	23	24	24	24	25	25	25	25	25	25			
1	0	2	0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	26	27	27	27	28	28	28	28			
1	10	1	50	16	17	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	26	27	27	28	28	29	29	29	30	30	30			
1	20	1	40	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	31	31	31	31	31	31			
1	30	1	30	17	18	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	29	30	31	31	31	31	31	31	31	31			
				DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																															
				102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138													
h	m	h	m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
0	10	2	50	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9			
0	20	2	40	13	13	13	13	14	14	14	14	15	15	15	15	15	15	15	15	15	16	16	16	16	16	16	17	17	17	17	17	17			
0	30	2	30	18	18	18	19	19	19	20	20	20	21	21	21	22	22	22	23	23	23	23	23	24	24	24	24	24	24	24	24	24			
0	40	2	20	22	22	23	23	24	24	25	25	25	26	26	26	27	27	27	28	28	28	28	29	29	29	30	30	30	30	30	30	30			
0	50	2	10	26	26	26	27	27	28	29	29	29	30	30	31	31	32	32	32	33	33	33	33	34	34	34	35	35	35	35	35	35			
1	0	2	0	28	29	29	30	30	31	31	32	32	33	33	34	34	35	35	36	36	36	36	37	37	37	38	38	38	38	38	38	38			
1	10	1	50	30	31	31	32	32	33	34	34	35	35	36	36	37	37	38	38	39	39	39	40	40	40	41	41	41	41	41	41	41			
1	20	1	40	31	32	33	33	34	34	35	35	36	36	37	38	38	39	39	40	40	40	41	41	41	42	42	42	42	42	42	42	42			
1	30	1	30	32	32	33	34	34	35	35	36	36	37	38	38	39	39	40	40	40	41	41	42	42	42	43	43	43	43	43	43	43			

The correction is to be added to the approximate Greenwich time when the proportional logarithms in the Ephemeris are decreasing, and subtracted when they are increasing.

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.									
Side- real.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807	0 0.000
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1 0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2 0.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3 0.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4 0.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5 0.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6 0.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7 0.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8 0.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9 0.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10 0.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11 0.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12 0.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13 0.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14 0.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15 0.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16 0.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17 0.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18 0.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19 0.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20 0.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21 0.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22 0.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23 0.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24 0.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25 0.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26 0.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27 0.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28 0.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29 0.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30 0.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31 0.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32 0.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33 0.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34 0.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35 0.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36 0.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37 0.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38 0.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39 0.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40 0.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41 0.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42 0.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43 0.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44 0.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45 0.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46 0.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47 0.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48 0.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49 0.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50 0.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51 0.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52 0.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53 0.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54 0.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55 0.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56 0.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57 0.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58 0.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59 0.161
Side- real.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.



# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.									
Sidereal.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443	0 0.000
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1 0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2 0.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3 0.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4 0.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5 0.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6 0.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7 0.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	8 0.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9 0.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10 0.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11 0.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12 0.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13 0.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14 0.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15 0.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16 0.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17 0.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18 0.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19 0.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20 0.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21 0.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22 0.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23 0.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24 0.066
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25 0.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26 0.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27 0.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28 0.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29 0.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30 0.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31 0.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32 0.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33 0.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34 0.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35 0.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36 0.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37 0.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38 0.104
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39 0.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40 0.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41 0.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42 0.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43 0.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44 0.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45 0.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46 0.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47 0.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48 0.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49 0.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50 0.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51 0.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52 0.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53 0.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54 0.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55 0.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56 0.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57 0.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58 0.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59 0.161
Sidereal.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.									
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0 0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1 0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2 0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3 0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4 0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5 0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6 0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7 0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8 0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9 0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10 0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11 0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12 0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13 0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14 0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15 0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16 0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17 0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18 0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19 0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20 0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21 0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22 0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23 0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24 0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25 0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26 0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27 0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28 0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29 0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30 0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31 0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32 0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33 0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34 0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35 0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36 0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37 0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38 0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39 0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40 0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41 0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42 0.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43 0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44 0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45 0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46 0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47 0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48 0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49 0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50 0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51 0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52 0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53 0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54 0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55 0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56 0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57 0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58 0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59 0.161
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.

# TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.									
Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995	0 0.000
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1 0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2 0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3 0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4 0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5 0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6 0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7 0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8 0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9 0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10 0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11 0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12 0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13 0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14 0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15 0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16 0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17 0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18 0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19 0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20 0.055
21	0 3.4 0	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21 0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22 0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23 0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24 0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25 0.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26 0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27 0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28 0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29 0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30 0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31 0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32 0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33 0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34 0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35 0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36 0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37 0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38 0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39 0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40 0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41 0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42 0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43 0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44 0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45 0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46 0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47 0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48 0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49 0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50 0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51 0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52 0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53 0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54 0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55 0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56 0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57 0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58 0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59 0.162
Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.									
Mean Solar.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847	0 0.000
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1 0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2 0.005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3 0.008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4 0.011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5 0.014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6 0.016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7 0.019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8 0.022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9 0.025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10 0.027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11 0.030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12 0.033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13 0.036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14 0.038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15 0.041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16 0.044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17 0.047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18 0.049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19 0.052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20 0.055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21 0.057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22 0.060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23 0.063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24 0.066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25 0.068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26 0.071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27 0.074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28 0.077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29 0.079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30 0.082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31 0.085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32 0.088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33 0.090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34 0.093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35 0.096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36 0.099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37 0.101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38 0.104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39 0.107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40 0.110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41 0.112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42 0.115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43 0.118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44 0.120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45 0.123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46 0.126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47 0.129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48 0.131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49 0.134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50 0.137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51 0.140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52 0.142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53 0.145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54 0.148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55 0.151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56 0.153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57 0.156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58 0.159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59 0.162
Mean Solar.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.									
Mean Solar.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.
m s	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0 0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1 0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2 0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3 0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4 0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5 0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6 0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7 0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.154	3 48.013	8 0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9 0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10 0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11 0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12 0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13 0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14 0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15 0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16 0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17 0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18 0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19 0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20 0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21 0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22 0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23 0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24 0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25 0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26 0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27 0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28 0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29 0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30 0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31 0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32 0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33 0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34 0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35 0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36 0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37 0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38 0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39 0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40 0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41 0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42 0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43 0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44 0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45 0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46 0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47 0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48 0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49 0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50 0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51 0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52 0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53 0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54 0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55 0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56 0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57 0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58 0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59 0.162
Mean Solar.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.

# TABLE IV.—LATITUDE BY POLARIS.

## TABLE FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS.

Reduce the observed altitude of Polaris to the true altitude.

Reduce the recorded time of observation to local sidereal time.

If the sidereal time is  $\begin{cases} \text{less than } 1^{\text{h}} 17^{\text{m}}.2, \text{ subtract it from } 1^{\text{h}} 17^{\text{m}}.2; \\ \text{between } 1^{\text{h}} 17^{\text{m}}.2 \text{ and } 13^{\text{h}} 17^{\text{m}}.2, \text{ subtract } 1^{\text{h}} 17^{\text{m}}.2 \text{ from it;} \\ \text{greater than } 13^{\text{h}} 17^{\text{m}}.2, \text{ subtract it from } 25^{\text{h}} 17^{\text{m}}.2; \end{cases}$

and the remainder is the hour-angle of Polaris.

With this hour-angle take out the correction from Table IV, and add it to or subtract it from the true altitude, according to its sign. The result is the latitude of the place.

*Example.*—1885, November 10, at 9<sup>h</sup> 29<sup>m</sup> 29<sup>s</sup>, P. M., mean solar time, in longitude 29° east of Greenwich, suppose the true altitude of Polaris to be 29° 29': required the latitude of the place.

Local astronomical mean time . . . . .	9 29 29 <sup>h m s</sup>
Reduction from Table III, for 9 <sup>h</sup> 29 <sup>m</sup> 29 <sup>s</sup> . . . . .	+ 1 34
Greenwich sidereal time of mean noon, November 10, page 183 . . . . .	15 19 14
Reduction from Table III, for longitude (= 1 <sup>h</sup> 56 <sup>m</sup> east, or minus) . . . . .	— 0 19
Sum (having regard to signs) equals local sidereal time . . . . .	0 49 58 = 0 <sup>h</sup> 50 <sup>m</sup> 0
Subtract sidereal time . . . . .	1 17.2 <sup>h m</sup>
Remainder equals hour-angle of Polaris . . . . .	0 27.2
True altitude . . . . .	+ 29° 29.0
Correction from Table IV. . . . .	— 1 17.6
Sum equals latitude . . . . .	+ 28 11.4

TABLE IV.—1885.

Hour-Angle.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .
0 <sup>m</sup>	— 1 18.2	— 1 15.4	— 1 7.5	— 0 54.8	— 0 38.4	— 0 19.4
5	1 18.2 0.0	1 14.9 0.5	1 6.6 0.9	0 53.6 1.2	0 36.9 1.5	0 17.8 1.6
10	1 18.1 0.1	1 14.4 0.5	1 5.7 0.9	0 52.4 1.2	0 35.4 1.5	0 16.1 1.7
15	1 18.0 0.1	1 13.9 0.5	1 4.7 1.0	0 51.1 1.3	0 33.9 1.5	0 14.4 1.7
20	— 1 17.9 0.2	— 1 13.3 0.6	— 1 3.7 1.0	— 0 49.8 1.3	— 0 32.4 1.6	— 0 12.7 1.7
25	1 17.7 0.2	1 12.7 0.6	1 2.7 1.0	0 48.5 1.3	0 30.8 1.6	0 11.0 1.7
30	1 17.5 0.3	1 12.1 0.6	1 1.7 1.0	0 47.1 1.4	0 29.2 1.6	0 9.3 1.7
35	1 17.2 0.3	1 11.4 0.7	1 0.6 1.1	0 45.7 1.4	0 27.6 1.6	0 7.6 1.7
40	— 1 16.9 0.3	— 1 10.7 0.7	— 0 59.5 1.1	— 0 44.3 1.4	— 0 26.0 1.6	— 0 5.9 1.7
45	1 16.6 0.3	1 10.0 0.7	0 58.4 1.2	0 42.9 1.4	0 24.4 1.6	0 4.2 1.7
50	1 16.2 0.4	1 9.2 0.8	0 57.2 1.2	0 41.4 1.5	0 22.8 1.6	0 2.5 1.7
55	1 15.8 0.4	1 8.4 0.8	0 56.0 1.2	0 39.9 1.5	0 21.1 1.7	— 0 0.8 1.7
60	— 1 15.4 0.4	— 1 7.5 0.9	— 0 54.8 1.2	— 0 38.4 1.5	— 0 19.4 1.7	+ 0 0.9 1.7

Hour-Angle.	6 <sup>h</sup> .	7 <sup>h</sup> .	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .
0 <sup>m</sup>	+ 0 0.9	+ 0 21.1	+ 0 39.8	+ 0 55.7	+ 1 8.0	+ 1 15.6
5	0 2.6 1.7	0 22.7 1.6	0 41.3 1.5	0 56.9 1.2	1 8.8 0.8	1 16.0 0.4
10	0 4.3 1.7	0 24.3 1.6	0 42.7 1.4	0 58.0 1.1	1 9.6 0.8	1 16.4 0.4
15	0 6.0 1.7	0 25.9 1.6	0 44.1 1.4	0 59.1 1.1	1 10.3 0.7	1 16.7 0.3
20	+ 0 7.7 1.7	+ 0 27.5 1.6	+ 0 45.5 1.4	+ 1 0.2 1.1	+ 1 11.0 0.7	+ 1 17.0 0.3
25	0 9.4 1.7	0 29.1 1.6	0 46.9 1.4	1 1.3 1.1	1 11.7 0.7	1 17.3 0.3
30	0 11.1 1.7	0 30.7 1.6	0 48.2 1.3	1 2.3 1.0	1 12.4 0.7	1 17.5 0.2
35	0 12.8 1.7	0 32.3 1.6	0 49.5 1.3	1 3.3 1.0	1 13.0 0.6	1 17.7 0.2
40	+ 0 14.5 1.7	+ 0 33.8 1.5	+ 0 50.8 1.3	+ 1 4.3 1.0	+ 1 13.6 0.6	+ 1 17.9 0.1
45	0 16.2 1.7	0 35.3 1.5	0 52.1 1.2	1 5.3 0.9	1 14.2 0.5	1 18.0 0.1
50	0 17.9 1.6	0 36.8 1.5	0 53.3 1.2	1 6.2 0.9	1 14.7 0.5	1 18.1 0.1
55	0 19.5 1.6	0 38.3 1.5	0 54.5 1.2	1 7.1 0.9	1 15.2 0.5	1 18.2 0.1
60	+ 0 21.1 1.6	+ 0 39.8 1.5	+ 0 55.7 1.2	+ 1 8.0 0.9	+ 1 15.6 0.4	+ 1 18.2 0.0



